

**ADULT ATTACHMENT, ANGER REGULATION AND
AGGRESSION: INDIVIDUAL DIFFERENCES IN THE
EXPERIENCE AND EXPRESSION OF ANGER**

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Abstract

Attachment theory has increasingly been applied to the understanding of individual differences in emotion regulation, however application of the attachment framework to anger is underspecified. The present thesis describes three studies reporting relationships between attachment insecurity and anger expression, taking into account attachment-related differences in anger regulation. Using multiple regression analyses, the results of Study 1a indicated that attachment anxiety was a significant independent predictor of trait anger, while attachment avoidance and self-esteem were not. Study 1b extended these findings by examining whether the use of specific anger regulation strategies mediated the relationship between attachment insecurity and dispositional aggression (physical aggression, verbal aggression and hostility). Attachment anxiety was indirectly related to physical aggression and hostility, through the use of maladaptive regulation techniques and a lack of anger control; while attachment avoidance had an indirect relationship with hostility through anger suppression. Study 2 utilised an anger induction procedure to investigate the relationship between attachment insecurity, self-reported and physiological responses, and subsequent aggressive behaviour. Neither attachment dimension was significantly associated with physiological reactivity to the anger induction, however attachment avoidance was negatively associated with changes in self-reported anger. Attachment avoidance was once again a significant predictor of anger suppression, while attachment anxiety significantly predicted variance in aggression. Overall, the findings indicate that attachment anxiety is a predictor of dispositional anger and aggression, whilst attachment avoidance predicts the use of suppression to regulate anger, reduced self-reported anger responsivity and increased hostility. Implications for both theory and practice are discussed with suggestions for attachment and emotion regulation-based anger management interventions.

Keywords: Attachment, Anger Regulation, Suppression, Aggression, Hostility

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Chapter 1. Introduction

“Anger is problematic above all other negative affects for its social consequences... my anger threatens violence for you, your family, your friends, and above all for our society. Of all the negative affects, it is the least likely to remain under the skin of the one who feels it, and so it is just that affect that all societies try hardest to contain within that envelope under the skin.” Silvan Tomkins.

Attachment theory is becoming of increasing importance in the study of interpersonal behaviour and individual differences in emotion regulatory processes in adulthood (Mikulincer, Dolev & Shaver, 2004; Mikulincer & Shaver, 2003); however, there is a distinct lack of research considering attachment-related differences in the regulation of anger. A growing body of research supports an association between attachment and the aggressive expression of anger, as opposed to healthy controlled anger expression, with insecure attachment being associated with elevated hostility (Critchfield, Levy, Clarkin & Kernberg., 2008; Mikulincer, 1998), and overall aggression (Mikulincer & Shaver, 2007; Simons, Paternite & Shore, 2001). Yet still, there is little research considering the underlying mechanisms that facilitate this relationship. Thus, the present thesis was designed to investigate the association between attachment and anger expression (trait anger, hostility, physical aggression and verbal aggression), taking into account the role of anger regulation, to develop an understanding of attachment-related differences in the experience and expression of anger in the normal population.

Attachment Theory

In its early days, the aim of attachment theory was to develop an understanding of differential relationship styles and behaviours between infants and their primary caregivers. However, with life expectancy on the rise (World Health Organisation, 2015), developmental researchers have become increasingly concerned with how early attachment experiences interact with or inform aspects of development and functioning across the lifespan or, as John Bowlby so aptly put it, “from the cradle to the grave” (Bowlby, 1982, p.208). John Bowlby proposed that human beings possess an inherent motivational system that develops to promote successful survival through the regulation of proximity to a primary caregiver, which he coined the ‘attachment behavioural system’ (Bowlby, 1973). Bowlby developed an intricate framework in which it was suggested that the nature of individual infant-caregiver relationships leads to the development of an internalised representation, or internal working model, of relationships which influences an infant’s expectations and behaviours in future emotional interactions (1973).

Attachment theorists postulate that when emotive or distressing situations arise, this internal working model is activated and informs the infant’s emotional and behavioural reactions to that situation (Shaver & Mikulincer, 2002). This activation of the attachment system initially prompts biologically innate proximity seeking behaviours, in which an infant seeks comfort from their primary caregiver to support them through the destabilising situation and help them resume to a sense

of attachment security. This type of 'secure' attachment strategy is developed in response to a caregiver who is attuned to the infant's signals of distress and negative affect, and reacts in a positive and timely way to alleviate that distress (Ainsworth & Bell, 1970; Bowlby, 1969; Kobak & Duemmler, 1994).

However, where caregiving behaviour is non-responsive or unreliable, and thus proximity seeking is not deemed a viable option, 'insecure' or secondary attachment strategies develop as alternative approaches to regulating emotional states. When a caregiver does not demonstrate an appropriate level of responsivity to the infant's emotional outreach (i.e. providing either too little or too much attention), in time, the infant learns to become chronically self-sufficient and repudiates any reliance on the attachment dyad with the aim of avoiding further attachment-related distress (Dozier & Kobak, 1992; Mikulincer & Shaver, 2003). This reflects what Mary Ainsworth coined an 'anxious-avoidant' attachment (Ainsworth & Bell, 1970), and is referred to in the literature as a 'deactivating' strategy, as it is oriented at the maintenance of attachment system deactivation (Caldwell & Shaver, 2012; Fraley, Garner & Shaver, 2000; Magai et al., 2000; Mikulincer & Shaver, 2003; Mikulincer & Shaver, 2007). This is in contrast to a 'hyperactivation' strategy, termed 'anxious-ambivalent' attachment, which is often activated in response to a caregiver who is at times responsive, but inconsistently so (Ainsworth & Bell, 1970). As the terminology suggests, this strategy is concerned with maintaining heightened activation of the attachment system, with the aim of alerting and attaining constant attention and comfort from potential caregivers (Dozier, Stovall & Albus, 1999; Fox,

1994; Mikulincer & Shaver, 2003). However, these endeavours are coupled with an expectation of unavailability or rejection from the caregiver and, as with the anxious-avoidant style, a desire to avoid further rejection-related distress, often resulting in an inconsistent mix of pursuit and resistance (Ainsworth & Bell, 1970). A fourth attachment category was later identified by Main and Solomon, referred to as 'disorganised' (Main & Solomon, 1990). Disorganised attachment reflects an extreme form of attachment insecurity, thought to develop from maltreatment or some form of childhood trauma, and often results in a chaotic and disorganised style of interaction where the infant appears to lack consistent goal-directed attachment behaviours (Hesse & Main, 2000; Solomon & George, 1999).

The past thirty years has seen an increase in research investigating the impact of these early attachment experiences on adult relationships, consistently suggesting that as one becomes an adult, peers and romantic partners take over as the main source of attachment relationships (Collins & Read, 1990; Pascuzzo, Cyr & Moss, 2013). In the absence of any major altering life events (Hamilton, 1994), the way in which adults experience and behave within these adult relationships has been documented to reflect the internal working models they developed in response to the early encounters experienced with their primary attachment figure (Bowlby, 1973). While the body of research associated with adult attachment has grown more recently, the interest in attachment continuity across the lifespan itself is not new. In his original theory of childhood attachment, Bowlby suggested that "the patterns of interaction to which the [internal working] models lead, having

become habitual, generalized, and largely unconscious, persist in a more or less uncorrected and unchanged state even when the individual in later life is dealing with persons who treat him in ways entirely unlike those that his parents adopted when he was a child,” (Bowlby, 1988, p.130).

In the late 20th century, Brennan and colleagues conducted an extensive factor analysis of 482 items from a variety of self-report measures of adult attachment, reflecting 60 attachment-related constructs (Brennan, Clark & Shaver, 1998). They determined that adult attachment was best conceptualised as a two-dimensional construct, where insecure adult attachment is reflected by high scores on one or both of two underlying attachment dimensions: attachment anxiety and attachment avoidance (Brennan et al., 1998; Fraley, Waller & Brennan, 2000). The attachment anxiety dimension reflects the extent to which one is anxious about being rejected by others, while the attachment avoidance dimension, reflects the extent to which one limits or avoids close relationships as a result of a fear or expectation of rejection (Crowell et al., 1999). While those high in attachment anxiety are apprehensive with regards to the availability and responsiveness of others, their main goal is still to achieve attention from, and maintain proximity to, those around them (i.e. hyperactivation). Alternatively, those who score highly on the attachment avoidance scale have a discomfort with closeness and a goal of maintaining distance and independence from others so as to avoid the possibility of rejection (i.e. deactivation). John Bowlby theorised that dysfunctional anger and aggression are at the core of insecure attachment, suggesting that those who are

insecurely attached suffer a confliction between their underlying desire for proximity to their attachment figures, and their expectations about the responsiveness of others (Bowlby, 1988). Bowlby suggested that, as their behaviours compete with this underlying desire, angry feelings and behaviours become prominent. Thus, attachment theory may provide a valuable spring board from which the experience and expression of anger can be better understood.

Attachment, Anger and Aggression

Individual differences in the experience and expression of anger are relatively dispositional, in that they are found to be mostly consistent across the lifespan (Schum, Jorgensen, Verhaeghen, Sauro & Thibodeau, 2003). Buss and Warren propose a tripartite model of anger expression, containing three distinct but related facets: i) emotion/affect (i.e. trait anger; the tendency to experience angry feelings); ii) cognition (i.e. hostility; feelings of bitterness and suspicion of others); and iii) behaviour such as physical and verbal aggression (Buss & Warren, 2000). In line with current socio-cognitive approaches to aggression, attachment theory provides a valuable framework for understanding the direct relevance of cognitive and developmental factors in the development of aggressive tendencies, but additionally provides much needed insight into the importance of the relational and socio-emotional goals of aggressive behaviour (Moretti & Obsuth, 2011).

Insecure attachment, in contrast to secure attachment, has been consistently

linked with increasing levels of trait anger and hostility across the lifespan, from adolescence (Muris et al., 2004) to adulthood (Meesters & Muris, 2002; Mikulincer, 1998; Troisi & D'Argenio, 2004). The majority of research suggests that either the dimension of attachment anxiety or insecure attachment categories characterised by high levels of attachment anxiety (i.e. fearful or preoccupied attachments; Kidd and Sheffield, 2005; Mikulincer, 1998; Troisi & D'Argenio, 2004) are particularly associated with higher levels of self-reported trait anger than those reflecting attachment security. In a study investigating anger and jealousy in romantic relationships, Dutton and colleagues (1994) found that those classified as having a fearful attachment (measured categorically to reflect high levels of both attachment anxiety and attachment avoidance combined) demonstrated significantly more anger than those considered to be preoccupied (i.e. high in attachment anxiety, but low in avoidance) (Dutton, Starzomski, Saunders & Bartholomew, 1994). These findings suggest that attachment anxiety specifically may act as a risk factor for increasing levels of trait anger, and that this risk may be exacerbated when levels of attachment avoidance are also high. Meanwhile, Mikulincer (1998) found that those classified as anxiously attached demonstrated lower levels of hostility than those with an avoidant attachment, suggesting that while the affective facet of anger expression (i.e. trait anger) may be higher in those high in attachment anxiety, the cognitive component (i.e. hostility) may be more prominent in those high in attachment avoidance.

In terms of behavioural aggression, surprisingly little research has been

conducted to date. However, there are specific areas of research in which the attachment-aggression link has been given more direct attention. For example, attachment insecurity has been well documented as a risk factor for relational violence, both in terms of being an abuser and a victim (Bartholomew & Allison, 2006; Mikulincer & Shaver, 2007; Senchak & Leonard, 1992). There is also extensive research on the relationship between insecure attachment and aggressive and antisocial behaviour in adolescents and young adults (Moretti & Obsuth, 2009). Insecure attachment is also consistently over-represented in institutional samples, but extreme forms of interpersonal aggressive behaviour and violence (e.g. rape and murder) are more often associated with a disorganised/unresolved style of attachment, commonly in parallel with more severe psychopathologies, such as narcissistic or antisocial personality disorders (Van IJzendoorn, Feldbrugge, Derks, De Ruiter, Verhagen, Philipse, Van der Staak & Riksen-Walraven, 1997), and/or a background of childhood abuse (Fonagy Leigh, Steele, Steele, Kennedy, Mattoon, Target & Gerber, 1996; Fonagy & Target, 1995). Attachment insecurity has also been implicated in a tendency towards juvenile aggression and externalising behaviours, including early onset conduct disorder (e.g. Lyons-Ruth, 1996; Van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). However, the majority of studies highlighting an association between attachment insecurity and behavioural aggression have been concerned with levels of attachment insecurity (or prevalence of insecure attachment categories, depending on the measurement approach used) in those who have committed an offence or who are considered to be at high risk of violence.

However, the empirical literature that attempts to identify the ways in which attachment insecurity is associated with behavioural aggression, in the normal population, is sparse. In order to fully understand instances of abnormal human development, it is essential that we first build a picture of what we consider to be 'normal' development (Riccio, Sullivan, & Cohen, 2010). In other words, it is crucial that we aim to understand the interaction between attachment insecurity and aggression not only in a forensic or clinical population, but also in those who appear to be functioning relatively well within society, and who may or may not be at risk for serious aggressive behaviour in the future. The association between the experience of anger, and whether or not that anger is expressed aggressively, will depend largely on how that anger is regulated by the individual. Therefore, attachment-related differences in anger regulation may provide some insight into the association between insecure attachment and aggression.

Attachment and Emotion Regulation

Research suggests that attachment anxiety and attachment avoidance are differentially characterised by maladaptive, but goal-congruent, methods of emotion regulation (Caldwell & Shaver, 2012; Fraley et al., 2000a; Gentzler et al., 2010). Emotion regulation is defined as "the extrinsic and intrinsic process responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals"

(Thompson, 1994; pp.27). As emotions play a crucial and influential role in a number of psychological, behavioural and social processes, it is essential that emotions, and the impulses associated with them, are effectively regulated (Gross, 1998). Research suggests that dispositional patterns of emotion regulation are developed over time, leaving individuals with a so-called 'regulatory style' (Cole, Michel, & Teti, 1994; Phillips & Power, 2007), which can be either adaptive or maladaptive (Gross & Levenson, 1997).

The majority of research investigating the relationship between attachment style and emotion regulation has concentrated principally on the regulation of feelings of sadness, disgust and attachment-related distress (Demaree et al., 2006; Gross & Levenson, 1995). Those high in attachment anxiety are characterised by a tendency to up-regulate or prolong their negative emotions, in such a way that their distress and need for support is clear to those around them in the hopes of achieving their goal of attention and proximity, and thus maintain a sense of attachment-system hyperactivation (Fox, 1994). On the other hand, those high in attachment avoidance appear to rely heavily on the use of suppression to down-regulate emotional information, in an attempt to avoid appearing vulnerable to others and experiencing further rejection-related distress (Caldwell & Shaver, 2012; Fraley et al., 2000a; Magai et al., 2000; Mikulincer & Shaver, 2003; Mikulincer & Shaver, 2007).

Again, this is consistent with their goal of appearing independent, self-

sufficient and achieving attachment system deactivation. However, as suppression takes place towards the end of the emotion-generative process, it does not alleviate the experience of negative emotion all together (John & Gross, 2004); instead it serves to alter the behavioural response to emotional information so that the individual does not appear to be affected by the situation. This means that the negative emotion is often still experienced below the surface, indicating that this strategy is not particularly effective (Szasz et al., 2011).

The relationship between attachment and the regulation of anger has received little empirical attention to date. The ability to regulate one's own emotions effectively is especially important in the case of anger, as the expression of anger can have a negative impact on social relationships and has been linked to social maladjustment (Deffenbacher, 1992; Kubany et al., 1995; Lazarus, 1996; Mauss et al., 2007). This relationship may be somewhat more complex than the relationship between attachment and other negatively valenced emotions, as although appearing sad or distressed may have positive outcomes for those high in attachment anxiety, the expression of anger may afford both positive and negative consequences. Individuals high in attachment anxiety may have valid reasons to suppress anger, such as to avoid alienating their significant other, as well as reasons to express it, as expressing angry feelings may encourage others to cease a specific unwanted behaviour (Campbell & Muncer, 2008).

On the other hand, theoretically, as individuals high in attachment avoidance

are supposedly driven to inhibit any emotional experience that conflicts with their goal of maintaining independence and keeping their attachment system deactivated, it is very likely that they may also suppress anger as it is associated with threat-related thoughts and could cause feelings of distress. The expression of anger also implies that an individual is emotionally invested or involved in a relationship or interaction with another, which again contradicts their desire for interpersonal distance (Fox, 1994; Mikulincer & Shaver, 2003). However, expressing anger outwardly could in fact serve to maintain a distance between an individual and those around them as it may motivate avoidance behaviours in others (Lang et al., 1998). As the inappropriate expression of anger is related to a wide range of negative outcomes, including poor social relationships and general social maladjustment (Lazarus, 1996; Mauss, Bunge & Gross, 2007), it is important that research continues to identify key risk factors for maladaptive anger experience and expression. Within this thesis, it is proposed that attachment theory may provide a useful framework for understanding individual differences in the experience and expression of anger.

The small number of empirical studies in this area requires urgent attention as research on violent and aggressive behaviour suggests that it is not only an inability to inhibit or control anger that can lead to violence, as previously thought, but also a chronic over-control and suppression of anger (Davey et al., 2005). It is postulated that the excessive suppression of anger experience and expression over time causes a build-up of anger arousal that can potentially result in an eventual

outburst of severely violent behaviour. Davey and colleagues suggest that explicit anger will arise in these 'suppressors' when arousal is high as their psychological defences are not capable of managing such a high cognitive demand and their inhibition threshold is surpassed (Davey et al., 2005; Verona & Carbonell, 2000). As discussed above, this pattern is also seen in those high in attachment avoidance, whose use of suppression to regulate negative emotion, which is relatively effective in the short-term, has been shown to break down under extreme levels of stress or when complex cognitive tasks are introduced (Mikulincer et al., 2000, 2004). The question remains whether this suppression-tendency is also present in the context of anger.

The chronic use of suppression to regulate anger is also associated with negative health outcomes such as coronary heart disease (Everson-Rose & Lewis, 2005; Miller et al., 1996; Sirois & Burg, 2003), hypertension risk (Vogele et al., 1997), higher pain experience (Quartana & Burns, 2007; Van Middendorp et al., 2010), and reduced responsivity to pain management (Burns et al., 1998). The negative outcomes associated with anger suppression highlight the importance of research that can identify factors that may predict the use of anger suppression. Based on previous research on attachment and emotion regulation, it is expected that avoidance will be closely related to suppression as has been found in other emotional contexts. However, the main study proposed in this project is the first to experimentally investigate the relationship between attachment and anger regulation. It is hoped that the findings of this research will lead to

recommendations for effective anger management treatment for those who suffer with attachment-related anger problems, with the aim of reducing the likelihood of negative health outcomes.

The primary purpose of this research project was to examine the relationship between two adult attachment dimensions (attachment anxiety and attachment avoidance), dispositional anger, three specific anger regulation strategies (anger suppression, under-regulation and anger control) and aggression. Initially, before the empirical work conducted in this thesis is presented, the next chapter will present a comprehensive review of the literature relating to adult attachment, emotion regulation, anger and aggression, and self-esteem. Following on from a review of the literature, the empirical studies will be presented.

Firstly, this project used a questionnaire-based cross-sectional research design to determine the extent to which adult attachment predicts variation in trait anger scores (Study 1a). Secondly, the data collected for study 1a was used to determine whether the use of specific anger regulation strategies (anger suppression, under-regulation and anger control) played a mediating role in the relationship between attachment insecurity and three facets of dispositional aggression (physical aggression, verbal aggression and hostility) (Study 1b). Thirdly, a further empirical study was designed to allow for the more in-depth and implicit investigation of the relationships above. Specifically, this study looked at the relationship between attachment insecurity, changes in physiological arousal and

self-reported anger following an anger induction procedure and subsequent aggressive behaviour using an implicit measure of aggression (i.e. the Taylor Aggression Paradigm; Taylor, 1967). Wilson and MacLean (2011) define correlational research as a method of determining whether variation in any given naturally-occurring variable is related to changes in another naturally-occurring variable, in the absence of any form of manipulation of the independent variable (in this case, dispositional attachment insecurity). While this method cannot infer causation or directionality, regression techniques (including linear regression, parallel mediation and moderation analysis) were used to determine whether variation in adult attachment is predictive of variation in dispositional anger, dispositional aggression and reactive aggression, and to investigate the mediating or moderating effects that underlie these predictive relationships.

As the studies conducted and discussed in this thesis were carried out within 'normal' population samples, it is beyond the scope of this project to determine specifically how these findings impact upon a clinical population. However, an informed discussion is presented in chapter 6 to suggest ways in which the findings of this current thesis can potentially be applied in clinically relevant situations (for example, in anger management therapy in forensic settings), and recommendations are made for future research in the hope that this area of research will be carried forward and replicated in a population in which anger is a clinical problem (e.g. domestic violence perpetrators or violent offenders).

In spite of the limitations of this thesis (discussed in depth in chapter 6), the findings of this research provide insight into the neglected role of anger regulation in the relationship between adult attachment and aggression. Firstly, Study 1a demonstrated that attachment anxiety was a unique independent predictor of dispositional anger, and that neither attachment avoidance nor self-esteem contributed significantly to this model of trait anger. This suggests that those high in attachment anxiety are more likely to experience frequent and intense episodes of anger on a day-to-day basis, with or without provocation. Secondly, Study 1b provided preliminary evidence to suggest that attachment anxiety is indirectly associated with increased physical aggression, through the under-regulation of anger and poor anger control; and that the relationship between attachment anxiety and hostility is partially mediated by both of the above regulation processes and anger suppression. Further, attachment avoidance had an indirect effect on hostility, through anger suppression, specifically. Specifically, these findings suggest that both attachment anxiety and attachment avoidance serve as risk factors for specific facets of dispositional aggression, through maladaptive anger regulation processes. These finding provides a novel and important addition to the current body of attachment and emotion regulation literature.

Finally, Study 2 provided a more real-time, ecologically valid investigation of attachment-related differences in anger regulation and physically aggressive behaviour using a lab-based anger-induction procedure. The findings of this final study revealed that attachment avoidance was significantly associated with changes

in self-reported anger from baseline to post-induction, in a negative direction, such that attachment avoidance was related to reduced self-reported anger responsivity. Attachment avoidance was also a predictor of anger suppression following the anger-induction, providing further support for the association between this dimension and anger suppression. Unexpectedly, attachment anxiety was not related to changes in self-reported anger and neither attachment dimension was significantly related to physiological change following the anger-induction. However, attachment anxiety was a significant predictor of physical aggression.

Taken together, these findings provide support for the theoretical proposition that attachment avoidance is associated with anger suppression; and that this technique may be successful in minimising the external expression of anger, but does little to stem the associated hostile cognitions often associated with the experience of anger. Further, preliminary support is provided for the suggestion that attachment anxiety is associated with the under-regulation of anger and a lack of anger control capabilities, and such individuals who score highly on this dimension may be at an increased risk for aggression behaviour as a result of these deficits.

In light of these findings, anger-management programmes may benefit from targeting the development of a flexible range of adaptive anger regulation strategies to reduce aggressive cognitions and aggressive behaviour in those with high levels of attachment insecurity. Specifically, focus should be given to the development of techniques that aid in emotional acceptance and healthy emotional expression,

while those high in anxiety would further benefit from learning to use more adaptive control strategies to help them manage their anger and reduce the risk of aggressive outcomes. Furthermore, prevention and intervention efforts should also facilitate the development of secure attachment working models, which subsequently may improve regulatory confidence and capabilities.

Chapter 2. Literature Review

2.1 Attachment in adulthood

“[The caregiver role is] similar to that of the officer commanding a military base from which an expeditionary force sets out and to which it can retreat, should it meet with a setback. Much of the time the role of the base is a waiting one but it is none the less vital for that. For it is only when the officer commanding the expeditionary force is confident his base is secure that he dare press forward and take risks.” John Bowlby.

While attachment theory was originally developed with an aim to understanding how the dyadic relationship between an infant and their caregiver influences child behaviour, it is now increasingly being studied in terms of its relevance in adult attachment relationships. Research has identified that, in the absence of any significant life events, there is a strong level of continuity between the nature of an individual's relationship with their caregiver in childhood, and their relationship style with peers, romantic partners, and their own offspring in adulthood (Pascuzzo et al., 2013). The aim of this chapter is to provide an overview of the current literature on attachment in adulthood. Firstly, the development of attachment theory to explain childhood separation behaviours will briefly be introduced, to provide some theoretical context. The propensity of attachment theory to provide a valuable framework for understanding key aspects of development and functioning into adulthood will then be discussed. Issues surrounding the conceptualisation of attachment in adulthood will also be introduced, with the aims of justifying the dimensional approach taken in this thesis. Finally, evidence for attachment continuity from infancy to adulthood, and throughout adulthood, will be discussed

before a review of the literature on emotion regulation ensues.

Childhood attachment

Attachment theory was originally developed to explain the interaction between the quality of the infant-caregiver relationship, and associated differences in child behaviour, through the interpretation of infant behaviour during and following instances of separation from their primary caregiver. John Bowlby suggested that the nature of the infant-caregiver relationship leads to the development of an internalised representation of relationships which influences the infant's expectations and behaviours in future emotional interactions (Bowlby, 1973). When emotive situations arise, these 'internal working models' are activated and subsequently inform the infant's emotional and behavioural reaction to that situation. Bowlby suggested that these internal working models become consolidated over time based on an individual's past behavioural-system activation, during which they use cognitive-behavioural techniques such as appraisal to determine what behaviours are effective or ineffective in terms of attaining their goal of attachment figure proximity. In other words, through repeated interactions, the behavioural system adapts to reflect consistent expectations for specific attachment figures (Mikulincer & Shaver, 2007). Over time, these working models function in an implicit, automatic way, influencing personality development and informing how the attachment system functions in adulthood (Bowlby, 1980).

Kunda (1999) refers to these internal working models as 'hot cognitions', as they are chronically accessible remnants of past emotional experiences and serve to activate behavioural responses to future emotively-similar situations. These cognitive-affective structures are developed through attachment-specific episodic memories, declarative knowledge about the nature of interpersonal relationships, expectations and beliefs about the self and significant others, and one's knowledge and understanding of the regulatory processes required to manage emotive experiences effectively (Collins & Read, 1994; Shaver, Collins & Clark, 1996). Attachment theory posits that the key process through which early attachment experiences influence well-being and healthy functioning in adulthood is the "consolidation of a chronically accessible working model" (Mikulincer & Shaver, 2007; p25). Thus, these internal representations inform not only the activation of specific behaviours in childhood, with a primary caregiver, but also throughout adolescence and into adulthood, with peers and romantic partners.

Research shows that children form attachment bonds regardless of the nature or quality of the infant-caregiver relationship, and can become equally attached to nurturing, neglecting, and even abusive caregivers (Bowlby, 1956). However, the quality of the attachment relationship can have major implications for the way in which the attachment system is developed. Ainsworth and colleagues (1978) conducted observational research on infant behaviour during and after separation from their primary caregiver using the Strange Situation paradigm. The Strange Situation is a laboratory-based paradigm which involves the following 5

stages, during which infant behaviour is monitored and coded: 1. Parent and child are alone in the room; 2. Child explores the room without parental participation; 3. Stranger enters the room, talks to parent, and approaches child; 4. Parent quietly leaves the room; 5. Parent then returns and attempts to comfort child. Through this method, Ainsworth and colleagues identified three distinct classifications of childhood attachment behaviours, identifiable at 12 months of age: secure, avoidant and ambivalent (Ainsworth et al., 1978). Further research investigating attachment in relation to infant behavioural problems within high-risk families suggested that a fourth attachment type may exist in this age group: disorganised (Main & Solomon, 1990; van IJzendoorn, 1995). A meta-analysis of attachment research found these attachment systems to represent around 55%, 23%, 8%, and 15% of studied infants, respectively (van IJzendoorn, 1995). Depending on the nature of the infant-caregiver relationship, an infant's attachment style can be observed through a series of relatively consistent, organised behaviours (even in the case of the ironically named 'disorganised' attachment category).

Secure attachment is characterised by the child's understanding that their caregiver is responsive to their behaviours, and is available for consolation and comfort as and when required. This leads to the development of an internal representation of their attachment figure as being present, receptive and caring (Bowlby, 1980; Main & Cassidy, 1988). Securely attached infants use their caregiver as a 'secure base' from which they can explore their surroundings, thus facilitating healthy social and cognitive development (Byng-Hall, 1995). Bowlby refers to the

secure base role as being “similar to that of the officer commanding a military base from which an expeditionary force sets out and to which it can retreat, should it meet with a setback. Much of the time the role of the base is a waiting one but it is none the less vital for that. For it is only when the officer commanding the expeditionary force is confident his base is secure that he dare press forward and take risks” (Bowlby, 1988, p. 11).

While attachment security is developed as a result of responsive and supportive caregiver behaviour, the remaining three attachment classifications (insecure-avoidant, insecure-ambivalent and disorganised) are all reflective of attachment insecurity. Insecure-avoidant attachment often develops when the caregiver is absent or unresponsive to the infant’s behavioural signals of distress (Isabella, 1993). This type of experience, on a consistent basis, leads to the development of an internal representation of the caregiver as unavailable, resulting in a lack of confidence in the caregiver as a secure base from which to explore (Goldberg, 2000; Schofield & Beek, 2005). This leads the infant to develop a sense of autonomy and self-reliance in unsettling or distressing situations. Insecure-avoidant infants are not necessarily resistant to the caregiver’s attention when it is offered, but rather respond to it with indifference, they would not actively pursue them for interaction or support (Ainsworth et al., 1978).

Insecure-resistant attachment develops when the caregiver has an inconsistent parenting style, at times responding to the child’s distress with

attention, and at times with rejection or ignorance (Isabella, 1993). This inconsistency leaves the child feeling insecure about their relationship with, and ability to depend upon, their attachment figure. These infants often present with behaviours characteristic of both secure and insecure-avoidant attachment; they will often seek proximity to the caregiver, and exhibit distress when they are absent, but will also reject the caregiver's attention or comfort when it is offered (Goldberg, 2000). They also often display signs of anger and resentment towards the caregiver during attempts at interaction. Insecure-resistant infants tend to explore their surroundings significantly less than those who exhibit secure or avoidant patterns of behaviour (Ainsworth, 1970).

Finally, infant disorganisation, a breakdown of the attachment system, is thought to occur for a variety of reasons such as parental psychopathology, unresolved parental trauma or attachment-related loss, and abusive parenting (Lyons-Ruth, 1996; Main & Hesse, 1990; Schuengel, Bakermans-Kranenburg, & van IJzendoorn, 1999; van IJzendoorn et al., 1999). Main and Hesse (1990) also suggested that a disorganised style can develop when the caregiver is a source of both fear and comfort for the child, leading to confusion. This confusion is evident in the way the infant behaves in the presence of their caregiver, often chaotically switching between behaviours characteristic of insecure-avoidant, insecure-resistant and even secure styles (Main & Solomon, 1990; Schofield & Beek, 2005).

Attachment in adulthood

While childhood attachment is still an area of interest, especially in relation to early detection of risk factors for psychopathology, the impact of these early experiences on adult attachment relationships has received a substantial amount of attention from researchers. It is believed that as an individual develops into adolescence there is a shift in their attachment hierarchy and peers can often become more prominent attachment figures, providing an alternative secure base in times where there may be parental conflict (Allen, 2008; Pascuzzo et al., 2013). Then, as one becomes an adult, peers and romantic partners become the main sources of attachment relationships (Pascuzzo et al., 2013). In the absence of any major altering life events (Hamilton, 1994), the way in which adults' experience and behave within these adult relationships is thought to reflect the internal working models that were developed in response to their early attachment experiences with their primary caregiver (Bowlby, 1973). However, the attachment systems activated in adulthood are much more complex than those in infancy, and researchers have identified similar but distinct styles of attachment in adults (Bartholomew & Horowitz, 1991; Brennan, Clark & Shaver, 1998; George, Kaplan & Main, 1985; Hazan & Shaver, 1987; Kobak et al., 1993; Stein, Koontz, Fonagy, Allen, Fultz, Brethour, Allen & Evans, 2002)

Essentially, adult attachment research covers two main relationship areas: Romantic attachments, which concerns the individual's behaviours and expectations

in romantic relationships; and parenting, which refers to how an individual's attachment processes influence their parenting behaviours (Bartholomew & Shaver, 1998; Ma, 2006). However, Kahn and Antonucci (1980) suggest that peers, other family members (such as siblings), religious figures and even pets can also serve as attachment figures in adulthood. However, none of these relationships are thought to be as strong as the bond that forms with a romantic partner (Antonucci, 1994; Mikulincer & Shaver, 2007). Ainsworth (1991) claims that the 'secure base' concept still applies in adult attachment, but is perhaps less obvious or observable than in childhood or infancy. In adulthood, the knowledge that a secure base is available allows for optimal functioning out with the relationship as the individual feels confident enough to regularly reduce proximity to their partner and explore (e.g. pursuing a career or hobby). While there appears to be agreement among researchers as to what constitutes an attachment relationship in adulthood, there are currently two differential approaches to the fundamental nature of those adult attachments; a categorical approach, which follows a similar structure to that set out by Ainsworth for childhood attachment, and a dimensional approach (Stein et al., 2002).

The conceptualisation of attachment in adulthood

Initially, adult attachment research aimed to identify attachment-related differences in how people experience close relationships, and how they recall their early caregiver experiences. Therefore, George and colleagues' Adult Attachment

Interview (AAI; George et al., 1985) is one of the most clinically relevant methods of assessing the relationship between childhood attachment experiences, current representations and parenting behaviour. The interview assesses an individual's accounts of childhood experiences, the language they use to describe these experiences, and their ability to provide a coherent recollection and reflection on these past events. Scores on the AAI allow for individuals to be categorised into one of the four classifications described above. However, the AAI does not address an individual's attachment style in current representations of attachment, relying exclusively on their perception of their primary caregiver experiences, and so it cannot be used to infer how childhood attachment relationships influence expectations and behaviour in adult relationships out with the parenting paradigm (Bartholomew & Shaver, 1998). Thus, a new body of research, concerned with the impact of adult attachment (i.e. one's experiences and expectation in peer/romantic relationships) on various aspects of psychological functioning, sought to develop more appropriate measures of attachment in adulthood.

This type of research took a similarly categorical approach, following the identification of three primary adult attachment 'styles' by researchers Hazan and Shaver. Hazan and Shaver developed three vignettes designed to reflect the attachment styles witnessed by Ainsworth in infants; secure, anxious-resistant and avoidant (Hazan and Shaver, 1987). Having asked a sample of 620 adult participants, recruited via newspaper sampling, to indicate which vignette they felt most closely reflected their relationship style, they discovered that these styles were similarly

distributed in adults as they were in children (56% secure, 19% anxious-resistant, 25% avoidant; Hazan & Shaver, 1987).

Similarly, Bartholomew and Horowitz (1991) supported the notion that adult attachment follows a similar categorical structure to that of childhood attachment, but suggested that adults can be classified as having one of four attachment styles; secure, preoccupied, dismissive-avoidant and fearful-avoidant. They suggested that secure attachment is characterised by high levels of self-esteem and self-worth, and a positive perception of others as responsive and attentive, which allows for comfortable interaction within and out-with close relationships. Research indicates that secure individuals tend to experience fewer severe relationship problems than those who fall into the other attachment categories (Bartholomew, 1990; Guerrero, 1996).

Preoccupied attachment, on the other hand, reflects very low self-worth which restricts flexibility within close relationships. Individuals perceive others in a much more positive light, are often over-dependent on their partner for gratification and approval, and usually feel that they are not worthy of their partner's love (Bartholomew & Horowitz, 1991). They are often anxious about the potential demise of the relationship, and fear that the relationship could end at any moment. The final two attachment categories proposed by Bartholomew and Horowitz are variants of attachment-related avoidance. The fearful-avoidant category is indicated

by an intense discord between an individual's suspicion and perception of others as rejecting and their desire to forge intimate relationships, and involves an active abstention from close relationships in an attempt to protect oneself against the distress of rejection. Finally, dismissive-avoidant individuals see themselves as worthy, but have a negative perception of others and so they are indifferent to the concept of close relationships. Dismissive-avoidant attachment reflects high independency and a complete lack of desire to attain intimacy or openness with others (Bartholomew, 1990; Guerrero, 1996). It is clear from the description of these categories, that they are not hugely dissimilar to Ainsworth's secure, resistant (preoccupied), and avoidant (dismissive and fearful) categories, but they are not considered comparative (Pascuzzo et al., 2013).

These categorical approaches to measurement were a popular choice in the early days of adult attachment research as their similar structure, in theory, afforded attempts to study attachment continuity from infancy to adulthood. However, there is much debate as to whether a categorical measure can comprehensively uncover the individual differences that may be associated with different attachment dispositions, as it is relatively constrained and can lead to instances of misclassification where individuals fall on the borderline between two categories (Cummings, 1990; Fraley & Spieker, 2003; Fraley & Waller, 1998; Hazan & Shaver, 1994; Kobak et al., 1993; Roisman et al., 2007; Wei, Russell, Mallinckrodt, & Vogel, 2007). As such, many researchers suggest that a dimensional approach may be more

suitable for explaining adult attachment (Fraley & Spieker, 2003; Fraley & Waller, 1998; Hazan & Shaver, 1994; Kobak et al., 1993; Roisman et al., 2007).

In contrast to the typological nature of the categorical approach, a dimensional approach poses that attachment style occurs along a spectrum, and can be measured by degree (Waller & Meehl, 1998). Cummings (1990) suggests that the dimensional approach carries more weight in the study of individual differences as it allows for more meaningful, and perhaps less obvious, information to be taken into consideration out with the wider categorisations of its alternative. This less constrained approach also controls against those on the borderline between two categories being potentially misclassified, providing a more accurate representation of adult attachment. Cummings also proposes that this more dimensional approach allows for stronger statistical power, larger sampling, and the comparison of normal and pathological populations along the same spectrum. Furthermore, Baldwin and Fehr (1995) argue that the test-retest reliability for dimensional measures of adult attachment is much stronger than for categorical measures, which are subject to more instability between measurement points.

With this in mind, Brennan, Clark and Shaver (1998) conducted a seminal factor analysis in which they compiled 323 statements from all available self-report measures of adult attachment, spanning 14 scales and 60 subscales in total, to

determine how they 'hung together' in a sample of 1,100 undergraduate students. Their analysis revealed that all of the measures analysed were fundamentally underpinned by two underlying adult attachment dimensions; one which they termed attachment anxiety, and another coined attachment avoidance (Brennan et al., 1998). From the 323 items administered, the 9 items that loaded the highest on each of the underlying scales were retained and used to develop an 18-item dimensional measure of attachment in adulthood; The Experience in Close Relationships Scale (ECR; Brennan et al., 1998).

The attachment anxiety dimension is thought to reflect the individual's internal working model of self (i.e. the extent to which they are anxious about rejection), and the attachment avoidance dimension is believed to reflect their model of others (i.e. the extent to which they limit or avoid close relationships as a result of that fear of rejection; Crowell et al., 1999). A highly anxious individual will often be apprehensive in regards to their partner's availability and responsiveness, whereas those who score low on the attachment anxiety dimension are likely to be more secure in this respect. On the other hand, those who score highly on the attachment avoidance scale usually prefer to maintain independence from their partner, and struggle to open up emotionally within their relationship (Fraley et al., 2000a). This is in contrast to those low in attachment avoidance, who are comfortable being part of an interdependent relationship, and don't show signs of reluctance to intimacy. It is clear that these descriptions are not in sharp contrast to those offered by Bartholomew and Horowitz (1991), in relation to preoccupied and

avoidant attachment classifications, and Hazan and Shaver (1987), in terms of avoidant and anxious-resistant attachment.

Theoretically, the ECR-R does allow for the classification of individuals into the four categories outlined in Bartholomew and Horowitz's model (see figure 1): individuals scoring low on both attachment anxiety and attachment avoidance would be considered secure; those with low attachment anxiety and high attachment avoidance would be classified as dismissive-avoidant; those showing high attachment anxiety and low attachment avoidance would be considered preoccupied; and those who score high on both attachment anxiety and attachment avoidance would fall into the fearful-avoidant category (Fraley, 2012). Some suggest that these classifications are much more flexible when considered in terms of the attachment anxiety and attachment avoidance dimensions than when they are used in a purely categorical fashion (Cummings, 1990). However, Chris Fraley and colleagues suggest against the classification approach wherever possible, on the basis that it can have a negative impact on the both measurement accuracy (due to its forcibility, as discussed earlier), and statistical power, as certain categories will commonly be under-represented (i.e. the two variants of attachment avoidance; Fraley, 2012).

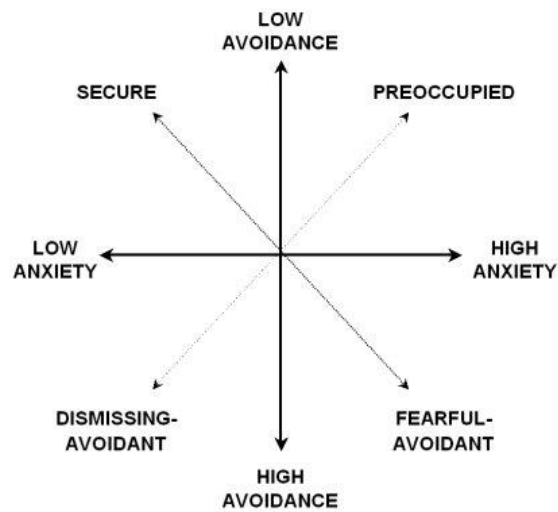


Figure 1. Mapping of adult attachment dimensions onto categorical items

Other researchers refer to these attachment dimensions in different terms, but they appear to explain the same fundamental concepts. Kobak and colleagues (1993) suggest that the first underlying dimension signifies level of attachment security (ranging from secure to insecure/anxious) and the second concerns the strategy used to deal with insecurity (ranging from hyperactivating to deactivating). This has been supported by Stein and colleagues (2002) who, following a comparative study of five self-report attachment measures, posed an attachment anxiety dimension (ranging from secure to fearful) and a strategy dimension (ranging from preoccupied to dismissing coping strategies). Despite some discrepancy between terminologies used to label these dimensions, the idea of two underlying components, one concerning level of attachment anxiety and the other concerning strategies of coping with that attachment anxiety, is largely agreed upon

in the current literature. This approach allows researchers to identify how strongly individuals' attachment patterns fall within each style, and whether their thoughts and behaviours are reflective of more than one classification.

While research indicates that dimensional measures of attachment are more detailed and accurate than categorical measures (Brennan et al., 1998), categories still have their advantages, to some extent. The categorical approach is often still used in large-scale studies, especially where multiple variables are being assessed, as its data is quicker and easier to record and analyse (Maunder & Hunter, 2009). While there is still some disagreement in the literature as to which approach is ultimately 'correct' (Ravitz et al., 2010), the collaborative dimensional approach discussed here is becoming increasingly endorsed in the study of individual differences in adult attachment (Brennan et al., 1998; Cummings, 1990; Fraley & Spieker, 2003; Fraley & Waller, 1998; Hazan & Shaver, 1994; Kobak et al., 1993; Roisman et al., 2007).

The internal working models developed through the infant-caregiver relationship in childhood are proposed to impact upon an individual's expectations, experiences and behaviours in adult relationships (Bowlby, 1973). Research suggests that the attachment style formed in childhood is relatively stable throughout adolescence and into adulthood, where no significant life events interfere (Hamilton, 1994). Approaching adult attachment in a more dimensional way allows for a deeper, more meaningful understanding of individual differences in attachment behaviours

(Brennan et al., 1998; Fraley & Spieker, 2003; Fraley & Waller, 1998; Hazan & Shaver, 1994; Kobak et al., 1993; Roisman et al., 2007). Its ability to detect even subtle individual differences in both normal and pathological populations is crucial for the growing body of research on the relationship between attachment disposition and the development of psychopathology. Therefore, as the current thesis is specifically focused on individual differences in attachment, the dimensional approach, specifically the ECR-R (Fraley et al., 2000b), will be used to assess working models of attachment in adulthood throughout this project. However, as an abundance of research still relies on a categorical approach to the measurement of attachment, both evidence from dimensional and categorical studies will be discussed throughout this thesis. Therefore, where findings are discussed in terms of attachment anxiety and attachment avoidance, this will be in reference to studies in which a dimensional measure was used, while attachment typologies will be discussed where a categorical approach was taken.

The continuity of attachment from infancy to adulthood

In his theory of attachment in infancy, Bowlby continuously implied that attachment theory was not exclusively a theory of relationship functioning in infancy. He suggested that the attachment behavioural system played a role in multiple aspects of healthy, and unhealthy, functioning throughout the lifespan, and that the internal working models developed in childhood should also be identifiable in adulthood (Bowlby, 1969/1982). However, Bowlby also appreciated the fact that an individual's

attachment style or level of attachment security could be malleable if there is a significant positive or negative change in their circumstances or experiences. For example, someone who was relatively secure in infancy may experience abuse or loss in an adult romantic relationship, which may lead to a shift in their internal working models of both others and the self, subsequently reducing their levels of felt security and increasing their levels of attachment anxiety or attachment avoidance. Indeed, attachment security has been found to decrease following adverse life experiences such as abuse or loss of a family member (e.g. Waters, Weinfield & Hamilton, 2000). Similarly, someone high in attachment anxiety and/or attachment avoidance may experience a decrease in attachment insecurity following years in a relationship with a secure partner, who is consistently caring and supportive, as their negative working model of relationships is continuously disproved through positive interaction. In line with this, attachment security has been found to increase following marriage (Davila, Karney & Bradbury, 1999).

A study conducted by Waters and colleagues took a 20-year longitudinal approach to determine the extent to which attachment patterns maintained stability, and under what circumstances variation in attachment style may occur, in a sample of 60 middle class participants (Waters, Weinfield & Hamilton, 2000). This study initially used Ainsworth's Strange Situation paradigm to measure infant-caregiver attachment when the infants were 12 and 18 months old. Fifty of these infants were then followed up between the ages of 19 and 21 years, at which point the Adult Attachment Interview was administered to assess attachment patterns in adulthood.

Details of any significant life events between the first and second stages of study were also collected from the parents of the participants. The data collected revealed a moderate level of stability in attachment patterns between the first stage of measurement and the follow up 20 years later in roughly 33% of participants (a similar rate to that found by Baldwin & Fehr, 1995). Further, it was found that the instance of some form of negative life event (e.g. parental death, divorce or mental/physical ill health, instances of child ill health, or physical or sexual abuse within the family) was specifically related to changes in attachment style at the follow up assessment. This suggests that, in the absence of significant adverse life events, an individual's pattern of attachment does tend to be relatively dispositional, but are subject to flexibility, from infancy to adulthood (Waters et al., 2000).

Weinfield, Sroufe and Egeland (2000) explored attachment stability further in an at-risk sample to determine correlates of attachment continuity or discontinuity between infancy (12 and 18 months old) and 19 years of age. Again, the Strange Situation Paradigm and the Adult Attachment Interview were used to measure attachment style. Potential implicated factors including maternal life stress, maltreatment, maternal depression and family functioning were also assessed using a variety of interview and observational methods (see Weinfield et al., 2000 for more information). This study found 38.6% stability in attachment style from infancy to adulthood which was not statistically significant. However, as other studies (such as Waters et al., 2000) did find significant continuity, Weinfield and colleagues proposed that an exploration of possible correlates of continuity was still warranted.

Their analysis found that maltreatment, maternal depression and level of family functioning were all related to differences in continuity of attachment between infancy and adulthood in a high-risk sample.

Further investigation of factors influencing attachment continuity was conducted by Beijersbergen and colleagues, who conducted an adoption study, in order to control for intergenerational transmission of attachment, to determine the impact of parental sensitivity on attachment continuity from 12 months old (using the Strange Situation Paradigm) to 14 years of age (using the Adult Attachment Interview; Beijersbergen, Juffer, Bakermans-Kranenburg, & IJzendoorn, 2012). They found that 30.4% of secure infants remained secure in the follow-up AAI assessment, while only 15.2% of insecure infants were also deemed insecure at age 14, neither of which were statistically significant, demonstrating a 45.6% continuity rate from 12 months to 14 years. Analysis revealed that those who were stable in their attachment security demonstrated more maternal sensitive support at 12 months and 14 years than those who transitioned from securely attached to insecurely attached, while those who changed from insecure to secure tended to have less maternal support at 12 months, but more at 14 years, compared to those who were stable in their insecurity. This supports the theory that specific contextual factors, such as maternal sensitivity, can influence transitions in attachment style throughout the lifespan, indicating the importance of “continuity of context” for the continuity of attachment (Beijersbergen et al., 2012, p. 4).

However, it is important to note the preceding studies applied the AAI, which, as discussed earlier, measures an individual's current representations of significant childhood relationships. Thus, it does not provide insight into the pathway from childhood attachment to adult romantic attachment. While there is a strong theoretical argument for continuity between attachment in childhood (regarding primary caregivers) and adulthood (in terms of adult relationships), there is a distinct lack of research examining this concept. This is possibly due to the issues that arise in comparing measures of infant and adult attachment, which were fundamentally developed to measure different types of attachment relationships, and such were validated in largely different samples (Fraley, 2010). Further, the second time-point measured in these studies spans from the age of 14 to 21, which may arguably fall prior to many significant life events that may serve to alter attachment dispositions (e.g. loss of family members, marriage, divorce). Therefore, while providing insight into the extent to which attachment to parents is consistent from infancy to early adulthood, these studies do not necessarily provide evidence as to whether attachment style holds steady across the lifespan in a wider sense.

Investigation of the relationship between an individual's current attachment representations of their infant-caregiver relationship and their current romantic relationship found that the association between the two was moderate (Fraley, 2002), but as this study measured 'current' representation of childhood attachment, measured in adulthood, it still provides little insight into the longevity of attachment from infancy to adulthood. Only one study could be identified within the literature

that explored the relationship between categorisation in the Strange Situation Paradigm at 12 months old, and attachment processes in adult relationships at 21 years of age. This study, conducted by Steele, Waters, Crowell and Treboux, revealed a considerably moderate association between infant and adult attachment (.17; Steele et al., 1998, cited in Fraley & Shaver, 2000). This suggests a relatively weak association between attachment to a caregiver in infancy, and attachment to romantic partners in adulthood, but provides sparse evidence upon which to confirm or dispute this premise.

While the research on infant to adult attachment stability is lacking, some studies have attempted to identify whether adult attachment is consistent across adulthood. Baldwin and Fehr (1995) collated undergraduate student data from six research projects carried out across two years, providing a final sample size of 221 participants, with the aim of exploring variation in attachment across a specific time period within adulthood (as opposed to variation from infancy to adulthood). Participants rated their attachment style on Hazan and Shaver's vignette style attachment measure at two time points, with a 2- to 3- month gap between sessions. Their analysis revealed a 32.6% overall shift in attachment rating between sessions 1 and 2 (72 of the full 221 sample), with 19.5% of those who rated themselves as secure at time 1 demonstrating a shift in attachment style at time two, compared with 42.5% of those who classed themselves as avoidant and 68% of those who self-rated as anxious-ambivalent. Baldwin and Fehr argue that their findings call the continuous and trait-like nature of attachment into question, suggesting instead that

an individual's attachment style may vary across time and circumstance. For example, their previous research (Baldwin, Keelan, Fehr, Enns & Koh-Rengarajoo, 1996) found that an individual's attachment style can vary across different relationships, in that one may be secure in their relationship with their sibling, but insecure in their relationship with a romantic partner. This suggests that an individual's self-rating of their attachment processes at any given moment may in fact reflect "the subset of memories, self-concept, and interpersonal expectations activated at the time", as opposed to a global attachment disposition (Baldwin & Fehr, 1995), in the same way that relationship schemas have been found to vary depending on the situational factors under which they are motivated (Baldwin, Carrell, & Lopez, 1990).

Taken together, these studies suggest that attachment continuity is dependent on a number of situational and contextual factors. Attachment appears to be sensitive to significant shifts in both negative (e.g. maltreatment) and positive (maternal sensitive support) life circumstances, but there is evidence that in the absence of such instances, attachment remains relatively stable across the lifespan (Fraley, 2002; Stelle et al., 1998). There is also evidence to suggest that while individuals may display a relatively consistent attachment style, certain situational factors may lead an individual to experience the activation of an internal working model that is incongruent with their so-called 'dispositional' attachment style, for example causing an ordinarily secure individual to feel insecurely attached. Baldwin and Fehr (1995) suggested that this did not necessarily indicate a change in

attachment style, but rather a variation in the specific attachment-related memories that are activated in response to a certain event, or how the individual appraises that particular event.

An individual's level of attachment security has been consistently associated with their propensity to engage in the effective regulation of emotion (Mikulincer & Shaver, 2003). Similarly, research suggests that attachment anxiety and avoidance are differentially characterised by maladaptive approaches to emotion regulation (Caldwell & Shaver, 2012; Fraley et al., 2000a; Gentzler et al., 2010), indicating that attachment may provide a valuable framework for understanding individual differences in emotion regulation. This will be discussed in more depth in the following chapter.

2.2. Emotion and emotion regulation

“I have noticed that most people in this world are about as happy as they have made up their minds to be.” Abraham Lincoln.

The aim of this chapter is to provide an overview of the current literature surrounding emotion regulation. Firstly, both the concepts of emotion and emotion regulation will be critically explored, followed by a discussion of perspectives on the development of self-regulatory process from infancy to adulthood. Gross's (1998) Process Model of emotion regulation will then be introduced, with focus on regulatory strategies that take place towards the end of the emotion generative process and thus serve mainly to alter the expressive aspect of emotional episodes (i.e. response modulation), as such strategies are the focal point of this thesis. Attachment-related differences in emotion regulatory processes will then be discussed, with reference to the goal-oriented nature of emotion regulation.

Defining Emotion

Emotions have an important role in behavioural responding, decision making, memory processes and social interactions (Gross, 1998). However, in order for emotions to aid the successful functioning of each of these processes effectively, they must be appropriately regulated. We are presented with an abundance of emotionally arousing stimuli on a daily basis, with only a small amount of that stimuli leading to the experience of an actual emotion, which advocates that

emotions are regulated on a constant basis (Davidson, 1998). However, before an informed discussion of the processes and outcomes of emotion regulation can ensue, it is first important to clarify what is being regulated. Thus, consideration as to what an emotion is, in and of itself, is required.

While a wide variety of differing theoretical approaches to emotion are available, including basic theories of emotion such as that proposed by Ekman (1972) and Panksepp (1998), appraisal theories (Lazarus, 1991) and social constructionist perspectives (Mesquita, 2010), there are certain aspects of the generation and experience of emotion that incur relatively high convergence amongst theorists. First of all, emotions involve a chain of synchronised but flexible responses that are activated when a situation is appraised by the individual as taxing, opportunistic or meaningful in some way (Phillips & Power, 2007). An emotion is generally deemed meaningful when it in some way contributes to, or hinders, effective goal achievement (Gross, 2002), whether that goal be short- or long-term (e.g. getting to work on time or finding a suitable life partner), conscious or unconscious (e.g. standing up for yourself in an argument or swerving your car to avoid hitting a deer), socially objective or subjective (e.g. being kind to others or learning to play the trombone) or of some other nature (Gross et al., 2006). What is important is that achieving said goal is meaningful to the individual, and when this is the case, it engenders emotion-related responses to situations deemed relevant to that goal.

While one's experience of an emotion has often received a great deal of

attention (LeDoux, 2012), emotionally salient situations evoke alterations in more than just how an individual subjectively ‘feels’ about the present circumstances. Emotional cues can also trigger associated physiological changes in the neuroendocrine and autonomic nervous systems (Gross, 1998; Mauss, Levenson, McCarter, Wilhelm & Gross, 2005) thought to function as ‘cues to action’ for specific behavioural outcomes (which can then lead to further physiological changes depending on the nature of the behavioural outcomes; Lang & Bradley, 2010). For example, if one experiences a fearful situation, once they attend to that situation, their heartrate and blood pressure may rise, preparing the individual to flee or confront the fear-inducing situation (based on their appraisal of the circumstances). Should the individual flee, heartrate and blood pressure may return to normal, but if the individual opts for confrontation, physiological arousal may increase. Thus, emotional response tendencies in these domains often interact with one another and can be modulated by the individual, consciously or otherwise, to determine the final responsive outcome of any given emotional situation (Gross, 2015). This process is known as the modal model of emotion generation (see Figure 2).

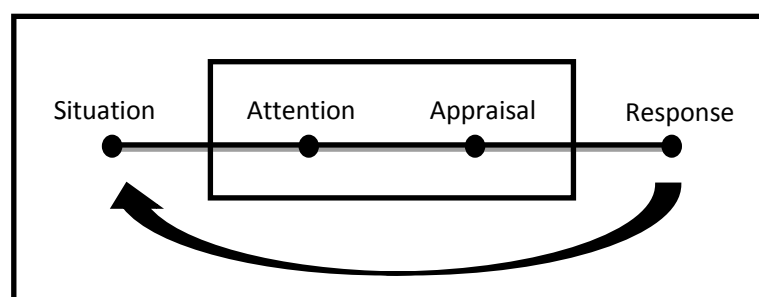


Figure 2. The Modal Model of Emotion Generation (Gross, 2015)

As mentioned earlier, emotions are often adaptive, facilitating information processing, decision making and interpersonal interactions (Gross, 1998). However, they can also be detrimental if they occur at inappropriate times, for unusual durations, or at inappropriate intensities, often leading to interference with the processes that effective emotional experience and expression enable and, in some cases, leading to psychopathology (Gross & Thompson, 2007). For example, inappropriate emotional intensity has been associated with a number of disorders including social anxiety disorder, when the intensity is high (Goldin, Manber-Ball, Werner, Heimberg, & Gross, 2009; Mauss, Wilhelm, & Gross, 2004), and psychopathy/antisocial personality disorder, when intensity is low (Herpertz, Werth, Lukas, Qunaibi, Schuerkens, Kunert, Freese, Flesch, Mueller-Isberner, Osterheider & Sass, 2001). Similarly, those diagnosed with schizophrenia have been found to express what are considered to be inappropriate or situationally incongruent emotions (Strauss, Robinson, Waltz, Frank, Kasanova, Herbener & Gold, 2011), for example, expressing happiness at a funeral or anger in response to receiving a desired gift. In terms of emotional duration, Jacob and colleagues (2008) found that the anger reactivity in those with borderline personality disorder lasted significantly longer than that of healthy controls, even though the intensity of their anger reactions did not differ, suggesting a tendency towards extended emotional experience in those with borderline personality disorder (Jacob, Guenzlet, Zimmermann, Scheel, Rusch, Leonhart, Nerb & Lieb, 2008).

While this highlights a link between psychopathology and inappropriately

experienced or expressed emotion, it is unclear as to whether these emotional differences are predictive of psychopathology, or vice versa, as there are many instances where each of the disorders mentioned above, and other disorders in which emotional disturbances are sometimes present, can occur in the absence of such emotional dysfunctions (Gross & Jazaieri, 2014). Nonetheless, the body of literature evidencing a link between emotion dysregulation and psychopathology highlights the importance of adaptive emotion regulation for healthy functioning.

Defining Emotion Regulation

Thompson defines emotion regulation as “the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one’s goals” (Thompson, 1994; pp.27); a definition widely accepted by fellow emotion researchers (Cole et al., 2004; Underwood, 1997). As discussed previously, the inability to successfully regulate emotions is closely linked to the development of various types of psychopathology and poor social functioning (Campbell-Sills & Barlow, 2007; Hinshaw, 2007; Lynch, Trost, Salsman, & Linehan, 2007; Shaver & Mikulincer, 2007; Sher & Grekin, 2007) as it allows emotions to present in inappropriate ways, at inappropriate times. In order to fully understand what successful emotion regulation is, it is important to first clarify what systems are proposedly being regulated during the regulation process, what the goals of emotion regulation are, and what regulatory strategies have been identified in the

literature.

There is a significant level of ambiguity in how the term emotion regulation is used within the literature leaving the field, to a certain extent, in a state of “conceptual and definitional chaos” (Buck, 1990, p.330). Firstly, some researchers use the term to explain the ways in which emotions serve to automatically regulate behavioural, physiological and cognitive response systems (regulation *by* emotions; Levenson, 1999), whereas others are more concerned with the way in which emotions themselves are regulated through the conscious or unconscious modulation of the above systems (regulation *of* emotions; Thompson, 1994). Emotion regulation can also be considered in terms of intrinsic emotion self-regulation (i.e. the regulation of one’s own emotional states), or the extrinsic regulation of other’s emotional states (e.g. trying to calm someone down after a stressful event; Gross & Thompson, 2007). As the strategies used to regulate one’s own emotions are fundamental to this thesis, the term emotion regulation will be used throughout to reflect the *self-regulation of* emotion.

Emotion regulation also falls under the wider bracket of affect regulation, as do coping, mood regulation, and psychological defences, and thus these processes are at times discussed interchangeably within the literature (Gross, 2015). However, there are key differences between these processes and it is important that these are taken into consideration when researching emotion regulation. Firstly, coping is primarily concerned with reducing the negative experience of emotion over a long

period of time (e.g. bereavement). Secondly, mood regulation is thought to have more of a focus on regulating the experiential aspects of emotion rather than the behavioural outcomes, as is the case with defences, which are often induced in response to adverse impulses in an attempt to prevent their negative experiential outcomes (Cramer, 2000; Larsen, 2000). Emotion regulation, on the other hand, can impact on both the experience and outcome of an emotion, and occurs consequently in response to emotional stimuli (Gross, 1998).

Much research has focused almost exclusively on the regulation of negative emotions, most often in terms of negative emotion depletion (e.g. Diamond & Hicks, 2005; Goldin, McRae, Ramel & Gross, 2008). However, the main role of emotion regulation is not simply to down-regulate negative emotion, but to increase, decrease or maintain the experience of both negative and positive emotions depending on the context under which the emotion is induced (Goodall, 2015; Tamir et al., 2007; Wadlinger & Isaacowitz, 2011). For example, in the case of Bipolar Disorder, it may be optimal for an individual to work to reduce positive emotions during a manic episode, but to increase them during a depressive episode. Similarly, it may be appropriate to maintain one's sadness during a funeral, but to down-regulate it the following day when you return to work.

Therefore, emotion regulation is a process that involves "maintaining desirable emotional states and terminating undesirable emotional states" in line with situation-specific goals (Wadlinger & Isaacowitz, 2011; p2), rather than one

that simply reduces the negative and increases the positive (Gross et al., 2006; Larsen, 2000). In attempts to achieve this, specific functional or dysfunctional regulation strategies are implemented either internally (e.g. cognitive reappraisal or suppression), or externally (e.g. exercise or drug use) when an emotive situation arises. Regulatory strategies will be discussed in more depth later in this chapter. Research suggests that individuals tend to adopt specific patterns of emotion regulation over time, depending on their perceived effectiveness for goal achievement, leading to the development of dispositional regulatory styles or preferences (Cole et al., 1994; Phillips & Power, 2007). Whether an individual develops an adaptive or maladaptive regulatory style can determine the extent to which emotion regulation has an impact on effective functioning and, in some cases, leads to psychopathology (Gross & Levenson, 1997).

Emotion regulation is typically considered as a conscious process, implemented by the individual in an attempt to override impulsive responses to emotional stimuli (Tice & Bratslavsky, 2000). However, Koole (2009) suggests that while some forms of emotion regulation do activate the same psychological and neurobiological systems as the deliberate regulation of behaviour and attention (Ochsner & Gross, 2008; Tice & Bratslavsky, 2000), emotion regulation can occur automatically without conscious effort (Bargh & Williams, 2007; Koole & Kuhl, 2007; Mauss et al., 2007). Indeed, a growing body of literature supports the proposal that emotion regulation, as with the attachment behavioural system discussed earlier (Bowlby, 1980; Mikulincer & Shaver, 2007), can function both at a conscious and

unconscious level (Berkman & Lieberman, 2009; Koole, 2009; Koole & Rothermund, 2011; Mauss, Bunge, & Gross, 2007). That is, an individual may not be aware of the regulation strategy they implement at any given time as the selection and implementation of such processes may happen implicitly. Hopp, Troy and Mauss (2011) suggest that unconscious emotion regulation is similarly goal-oriented, but the pursuit of such goals in the case of unconscious emotion regulation is not based on explicit intentions, but rather is guided by internalised values concerning emotion regulation.

Some researchers consider implicit and explicit emotion regulation as two separate independent processes, with the reduced cognitive effort required for implicit regulation rendering it a more adaptive and less costly approach (Mauss, Evers, Wilhelm & Gross, 2006). However, Gyurak, Gross and Etkin's dual-process model of emotion regulation suggests that the differences between implicit and explicit emotion regulation should be considered as more of a fluid distinction, with specific regulatory episodes varying in their levels of implicitness or explicitness in order to facilitate adaptive emotional functioning. The growing focus on the implicit regulation of emotion can prove problematic from a research perspective, as many studies rely heavily on self-report questionnaires to reflect strategies for emotion regulation (e.g. Gross & John, 2003; Pascuzzo et al., 2013; Tasca, Szadkowski, Illing, Trinneer, Grenon, Demidenko, Krynski, Balfour & Bissada, 2009). Arguably, this type of approach cannot effectively capture a potentially unconscious cognitive process such as this (Pietromonaco & Feldman-Barrett, 2000), and so a growing

body of research is embracing behavioural and physiological methods which can be more fine-grained in identifying unconscious regulation processes (e.g. Williams, Bargh, Nocera & Gray, 2009; Mauss et al., 2006; Ochsner, Bunge, Gross & Gabrieli, 2013). The development and implementation of such methods is especially key when investigating emotion regulation in those with regulatory deficits, who often display a discrepancy between their experience and expression of emotion (Aldao, 2013; Barlow, 2002). This highlights the importance of striving to measure such emotion regulatory processes through the use of implicit or indirect measures, such as physiological reactivity and behavioural observation.

The Development of Emotion Regulation

In order to understand the relevance of attachment theory to emotion regulation, it is important to consider how these regulatory capabilities are developed in childhood, within the framework of an individual's initial primary attachment relationship. In childhood, emotion regulation emerges as one of many fundamental self-regulatory processes, and facilitates the development of more advanced processes further down the line, including cognitive and behavioural regulation (Calkins & Howse, 2004). Thus, the level and nature of emotion regulation development achieved in infancy can determine one's capabilities in regulating the experiential, cognitive and behavioural aspects of emotion throughout the lifespan (Calkins & Hill, 2007), and can impact on and interact with the development of other key psychological processes (e.g. motor functioning, cognitive development and

social competency; Diamond & Aspinwall, 2003; Kopp, 1992). This suggests that acquiring an adaptive approach to emotion regulation during these stages of development is crucial in achieving overall healthy development and effective adaptation, and circumventing psychopathology (Cassidy, 1994; Eisenberg et al., 1997; Frick & Morris, 2004; Silk, Steinberg, & Morris, 2003).

From a developmental perspective, it is suggested that emotion regulation and the attachment behavioural system have a potentially common antecedent: they both initially emerge through early interpersonal collaborations between an infant and their primary caregiver (Calkins & Hill, 2007). Accordingly, Schore (2000) proposes that the infant-caregiver relationship is a dyadically regulating biological unit throughout at least the first 12 months of infant life. Gergely, Koos and Watson (2010) suggest that infants enter the world with an inability to differentiate between basic categorical emotions, and that this skill is fostered through affective mirroring exchanges with their primary caregiver (i.e. within the attachment relationship). Affective mirroring involves a parent empathically replicating an infant's emotional displays so that the infant becomes sensitive to emotional state cues, develops an ability to categorise emotional experiences and can form a coherent sense of self (Fonagy, Gergely & Jurist, 2004). Fonagy and colleagues (2004) suggest that this process relies on the parent's ability to accurately interpret the infant's emotional displays and mimic those expressions so that the infant can begin to match the parent's replicated emotional display with their own internal emotional experience. Through the repetition of this type of interaction, the infant can establish emotional

awareness and an ability to label internal and external emotional states. This process is also thought to influence the development of emotion regulatory processes by helping the infant identify that emotional states are temporary (e.g. through the use of on-and-off mimicking, where the parent mimics a negative emotional display initially, then displays a positive emotion), and controllable, as they realise they are able to control the emotional display of their caregiver (Fonagy et al., 2004).

In these early stages of development, the caregiver initially adopts a regulatory role for the child, regulating their emotions for them as they arise and demonstrating their own strategies of regulation (through a process known as 'modelling'; Calkins & Johnson, 1998; Grolnick et al. 1999), for the child to observe, mimic and eventually internalise (Gergely & Watson, 1999). One example of parent-led regulation is disruption-soothing; where the parent induces an alternative emotion that is incongruent with the emotion that the infant initially displayed (Fonagy et al., 2004). For example, if the infant displays distress, the parent may pull silly faces to induce laughter and positive affect. Another similar approach modelled by the parent is distraction-soothing, in which the caregiver directs the infant's attention to a more positive mood-inducing stimulus such as the child's favourite toy or cartoon (Mirabile, Scaramella, Sohr-Preston & Robison, 2009). Mirabile and colleagues recruited 55 low-income mothers and observed the mother's socialisation of emotion regulation (e.g. strategies used to shift the infant's attention when distressed, such as distraction and soothing efforts, and emotion-intensifying

behaviours such as negative verbal or physical acts towards the infant when distressed) with their 2-year-old using a waiting activity. This involved the infant-parent dyads engaging with toys, which were then removed from the room so that the researchers could observe how the mothers responded to and regulated the infant's frustration at the removal of the items. They found that when parents used more negative emotion-intensifying techniques, infants displayed more negative emotional reactions and maladaptive self-regulation techniques, as opposed to those whose mothers implemented more positive distraction techniques using alternative stimuli, or who made efforts to verbally soothe the infant. However, the time-span of the observations in this study was brief (i.e. 5 minutes), and so it cannot provide a clear picture of the caregiver's dispositional behaviours. It is possible that, in the presence of a researcher, the mothers taking part may have been more inclined to implement more positive strategies to regulating their infant's emotions. Regardless, both theoretical and empirical literature suggests that repeated exposure to these regulation strategies through parental modelling helps the infant internalise these techniques for future self-regulatory implementation (Scaramella & Leve 2004). Thus, it is through these dyadic caregiver interactions that the child is able to cultivate a "rich behavioural repertoire of strategies" to monitor and modify their emotional experiences throughout the lifespan (Calkins & Hill, 2007, pp. 232).

However, as mentioned earlier, the development of a repertoire of adaptive self-regulatory strategies relies considerably on the availability and emotional

responsiveness of this primary attachment figure (Fonagy et al., 2004; Schore, 2015). In the context of the attachment relationship, when a parent is attuned to their infant's affective signals and consistently demonstrates effective strategies to regulate the infant's distress, the infant can then implement these strategies adaptively and independently in later childhood and into adulthood (Nathanson, 1992). For example, if a parent uses a toy to distract an infant from distress, in time, that infant can learn to use external distraction techniques to alleviate their own distress in the future (Scaramella & Leve 2004).

On the other hand, if maladaptive regulation methods are regularly demonstrated by the caregiver, or the caregiver does not attend to or accurately identify the infant's emotional displays, the infant will not be equipped with the necessary skills to self-regulate in the future and may progress to develop a long-term maladaptive approach to emotion regulation (Fonagy et al., 2004). For example, Edwards and colleagues (2005) investigated the relationship between mother's socialisation and their infant's emotional understanding, comparing neglectful mothers with a group of non-neglectful mothers (n=48). They measured the level of maternal support provided, dyadic verbalisations about emotion and negative affect experienced by the mothers and found that neglectful mothers responded more negatively to their infant's displays of happiness, leaving the infants with difficulties in emotional understanding and processing, resulting in withdrawal responses to emotional stimuli (Edwards, Shipman & Brown, 2005). In other words, the experience of collaborative and dyadic emotion regulation within the

attachment framework provides a template for later self-regulation that can be either adaptive or maladaptive. Indeed, further research suggests that the emotion regulatory techniques implemented in childhood closely reflect experiences of caregiver availability in infancy, with secure children relying on social referencing and caregiver intervention through the use of proximity seeking, whilst insecure children opt for more self-administered techniques such as self-soothing and solitary exploration (Braungart & Stifter, 1991; Nachmias et al., 1996).

Together, this literature suggests that emotion regulation is initially an external and dyadic process, which takes place in the context of the infant-caregiver relationship, and later becomes internalised to form a representation of emotion and emotion regulation throughout the lifespan (Calkins & Hill, 2011; Schore, 2015). However, the nature of the attachment relationship between the infant and their caregiver can determine whether those representations comprise of adaptive or maladaptive regulatory strategies (Braungart & Stifter, 1991; Fonagy et al., 2004; Nachmias et al., 1996).

Emotion Regulatory Strategies

Gross (1998) identified five key strategies that can be used to achieve emotion regulation, which occur at different stages of the emotion-generative process: situation selection, situation modification, attention deployment, cognitive change, and response modulation. The first four of these strategies occur in the early stages

of processing, before a complex emotion has developed in response to the emotion-invoking stimuli (antecedent-focused strategies), while response modulation occurs once the emotion has been formed (response-focused strategy). Response-focused strategies are thought to be less adaptive as their late implementation results in much higher cognitive costs to avoid or reverse any unwanted emotional outcomes (Mauss et al., 2007; Schutte et al., 2009).

The first strategy outlined by Gross is situation selection, which involves purposefully avoiding or approaching a situation that could potentially cause either a negative or positive emotional reaction, in an attempt to increase or lessen their chances of experiencing that particular emotion (Gross, 1998). Gross suggests that this approach is among the most difficult, as it requires an understanding of both the situation and the most likely emotional responses to that situation. Research increasingly indicates that this type of knowledge and understanding is difficult to develop and is often subject to significant bias, with people often struggling to accurately recall previous emotional experiences, and to predict the nature of their emotional reactions to future situations (Gilbert et al., 1998; Kahneman, 2000; Loewenstein, 2007). This makes it difficult for the individual to build accurate representations to inform the situation selection process. There could also potentially be long term costs associated with a situation selection approach, as someone who chooses to avoid social situations to alleviate their fear of embarrassment may feel better in the short term, but may end up feeling isolated in the long term, as is often found to be the case with social avoidance strategies

(Johnson, Lavoie & Mahoney, 2001).

The second strategy is referred to as situation modification, and involves the physical modification of a situation to reduce the negative emotional outcomes of that situation (Gross, 1998). For example, if a radio presenter announces a song that reminds you of an ex-partner, you may choose to change the radio station before it comes on. So, rather than allowing the situation to upset you, you chose to physically alter the situation before it affects you emotionally. For example, study by Nachmias and colleagues (1996) found, in a sample of 77 18-month old infants and their mothers, that toddlers' emotional coping in a stressful situation (indicated by their salivary cortisol levels and behavioural inhibition following novel events) was aided both by the specific interventions of their mothers and the existence of a secure attachment between them. Keltner and Kring (1998) further suggest that emotional expression can also be used to modify a potentially negative emotional situation. For example, putting on a sad expression during an argument with a partner may result in the partner feeling guilty and the argument ending, thereby modifying a potentially distressing situation. However, importantly, this outcome could be seen to reflect an effect of emotional expression rather than emotion regulation (Gross, 1999).

The final pre-emptive strategy proposed by Gross is that of attentional deployment, which involves altering one's attentional focus, rather than modifying the environment, so as to avoid negative emotional outcomes (Gross, 1998). This

approach can be seen from early infancy, when children actively cover their eyes during a scary scene in a movie (Rothbart et al., 1992). Main suggested that infants vary in their attentional flexibility depending on their attachment style (Main, 2000; Main et al., 2005). For example, secure infants tend to be more flexible as they can easily switch their attention between the parent and features of the environment safe in the knowledge that their caregiver will be available as and when needed. On the other hand, Main and colleagues found that insecure infants tend to be less flexible, as they focus purely on the environment (avoidant) or purely on the parent (ambivalent). Main also found this 'attentional avoidance' to be reflected in adults, as those with a dismissing-avoidant attachment style tended to direct focus away from the discussion of attachment relationships during the Adult Attachment Interview, while those with preoccupied attachment tended to focus heavily, but confusedly, on those relationships and their outcomes (Main, 2000; Main et al., 2005). The main methods of attentional deployment discussed by Gross are rumination and distraction (Gross, 1998).

Distraction directs attention towards non-emotional features of the situation, avoiding any emotion-eliciting stimuli (McRae, Hughes, Chopra, Gabrieli, Gross & Ochsner, 2010). As well as redirecting external attention, distraction can also redirect internal attention. For example, if someone is worried that they might fail a test, they may distract themselves with memories that contradict that negative emotion (e.g. 'I've never failed a test before'), thereby reducing the negative emotions they are experiencing. Rumination, on the other hand, refers to an

obsessive focus on the emotional aspects of a situation, and their consequences (Gross, 2007). Using ruminative processing for negative events is related to increased negative affect, increased low-level anxiety and the onset of depressive symptoms (Borkovec et al., 1995; Just & Alloy, 1997), while ruminating on positive events is linked to high levels of positive affect and positive thought (Gruber et al., 2009). However, this is often to an extreme extent and has been linked to bipolar disorder (Feldman et al., 2008; Johnson et al., 2007; Johnson et al., 2008). However, some research does suggest that rumination can, at times, be positive as focusing attention on the potential threat of future situations may reduce the intensity of negative emotional response to that situation as any threats that do present themselves are already pre-empted (Borkovec et al., 1995). However, conflicting research also suggests that, as rumination keeps threat-related attachment concerns active in working memory, it increases consistent negative affect over the long term (Mikulincer et al., 2003).

Even in situations where emotional stimuli have been selected, modified and attended to using the techniques above, a fourth regulatory strategy, cognitive change, can be used to appraise the situation and alter the emotional outcomes of that stimuli (Gross, 1998). There are a variety of cognitive change approaches outlined in the literature, including cognitive reappraisal (Gross, 2002; John & Gross, 2007), downward social comparison (Taylor & Lobel, 1989; Wills, 1981), and cognitive reframing (Gross, 1998). Cognitive reappraisal requires an individual to reinterpret the meaning of a situation or event, or of their ability to deal with it,

thereby altering their emotional reaction to the situation (Gross, 2002; John & Gross, 2007). For example, someone who was unsuccessful in a job interview may reappraise the situation in such a way that they view it as a learning experience that will allow them to be better prepared for future interviews. Downward social comparison, on the other hand, involves the individual comparing themselves to someone less fortunate (Taylor & Lobel, 1989; Wills, 1981). In this example, the individual could decrease the likelihood of negative emotional outcomes by thinking about the many people who did not make it past the application stage and were not given the opportunity to interview for the job. By putting the situation in perspective, the individual can view it in a more positive light (Gross, 1998). Cognitive reframing refers to the individual 'reframing' a failure to meet their goal. For example, if one was to put off writing an essay in favour of cleaning the house, this could at first be construed as a failure to meet one's writing goal for the day. However, one could reframe that failure by focusing on achieving the goal of a tidy house. Gross also touches briefly upon the cognitive appraisal of physiological responses to emotion-eliciting situations. For example, a performer's ability to appraise their high heart rate as positive (i.e. excitement) rather than negative (i.e. nerves) may determine how well they deal with that experience (Gross, 1998). However, this is a relatively new area with little empirical support as of yet.

The final emotion regulation process is that which attempts to modulate how an emotion presents once it has already been generated by the emotion-eliciting stimuli. This process can impact directly upon the physiological, experiential and

behavioural responses to the emotion. Response modulation may involve the external regulation of emotion; for example, people may use things such as medication, alcohol, exercise and relaxation or even food to alter their experiential or physiological responses to an emotional situation (Cooper, Frone, Russell & Mudar, 1995; Evers, Marjin Stok & de Ridder, 2010; Greenberg, 2002). However, the most commonly documented method of response modulation is expressive suppression (Gross et al., 2006). Expressive suppression involves inhibiting the outward expression of emotion, even when high levels of emotion are experienced below the surface (Richards & Gross, 1999). Research conducted by Gross and colleagues suggests that people opt to implement a suppression strategy in 25% of emotional instances (Gross, 1999). However, the literature suggests that while this strategy is effective in suppressing the outward expression of emotion, such that the individual does not appear to be affected by emotional situations, it fails to impact upon the experiential and physiological component of emotion (Gross, 1998; Richards & Gross, 1999). In fact, studies in which participants are instructed to either 'watch' or 'suppress' (i.e. inhibit any expressive behaviour so that an outsider would not be aware of what they were feeling) whilst viewing sad, neutral and amusing movie clips have suggested that suppression is linked to increased physiological responding to emotion-inducing situations, as evidenced by activation of the sympathetic nervous system (Gross, 1998; Gross & Levenson, 1997). Suppression has also been found to have a negative impact on the coding of information, and subsequent recall. A series of two studies conducted by Richards and Gross (1999) investigated the impact of implementing a suppression technique

on the coding and recall of information encountered whilst suppression was taking place. Across these studies, 143 female undergraduate students viewed emotion-eliciting picture slides and were either instructed to view them freely, or suppress any emotional expression whilst viewing the images. Following a distractor tasks, participants took part in a set of unanticipated recall activities that required them to recall information presented alongside the slides in their original presentation. Those who were instructed to suppress performed significantly worse than those in the non-suppression condition on all recall tasks, suggesting that suppressing emotional expression can have a significant impact on memory processes.

Thus, while this strategy can be effective in the short term, when it is appropriate to inhibit the expression of a specific emotion, it appears to be detrimental and overall ineffective in the long-term, when it is used consistently and inflexibly. Research has consistently linked this expressive suppression approach to emotion regulation with high levels of attachment avoidance while, conversely, attachment anxiety is said to be associated with a chronic inability to inhibit emotional expression (Shaver & Mikulincer, 2002). This will be discussed in more depth in the following section.

Attachment security and emotion regulation

Shaver and Mikulincer (2002) suggest that when an individual is securely attached (i.e. low in attachment anxiety and attachment avoidance), they are better equipped

to manage their own emotional experience and distress through the flexible use of realistic and adaptive coping methods and the optimisation of assistance from those with whom they are in mutually supportive close relationships. It is suggested that this approach facilitates what is referred to as a 'broaden-and-build' process of attachment security, which allows for the accumulative development of a strong sense of self-efficacy in terms of the individual's ability to regulate their own emotions in the absence of external support, and fosters a resilient approach to emotion regulation (Mikulincer & Shaver, 2004).

As discussed earlier in this chapter, and as illustrated in figure 3, those who are high in attachment security have learned, from early interactions with primary caregivers, that they are generally able to approach the occurrence of negative emotions independently and effectively from a problem-solving perspective (e.g. through the use of cognitive reappraisal), and that support from others is both useful and available if required (Collins & Read, 1994; Mikulincer, 1995; Mikulincer & Florian, 1998; Shaver & Hazan, 1993). The provision of a secure base in early childhood allows an individual to develop the understanding that, even if their first attempts at regulation are unsuccessful, it is acceptable to 'trial and error' a number of other strategies until a suitable one is established. This process, accompanied by a supportive and encouraging caregiver, builds confidence in one's own ability to take a flexible, situation-specific approach to regulation and supports the exploration of alternative cognitive models of emotional instances without fear of uncertainty or failure (Mikulincer, 1997).

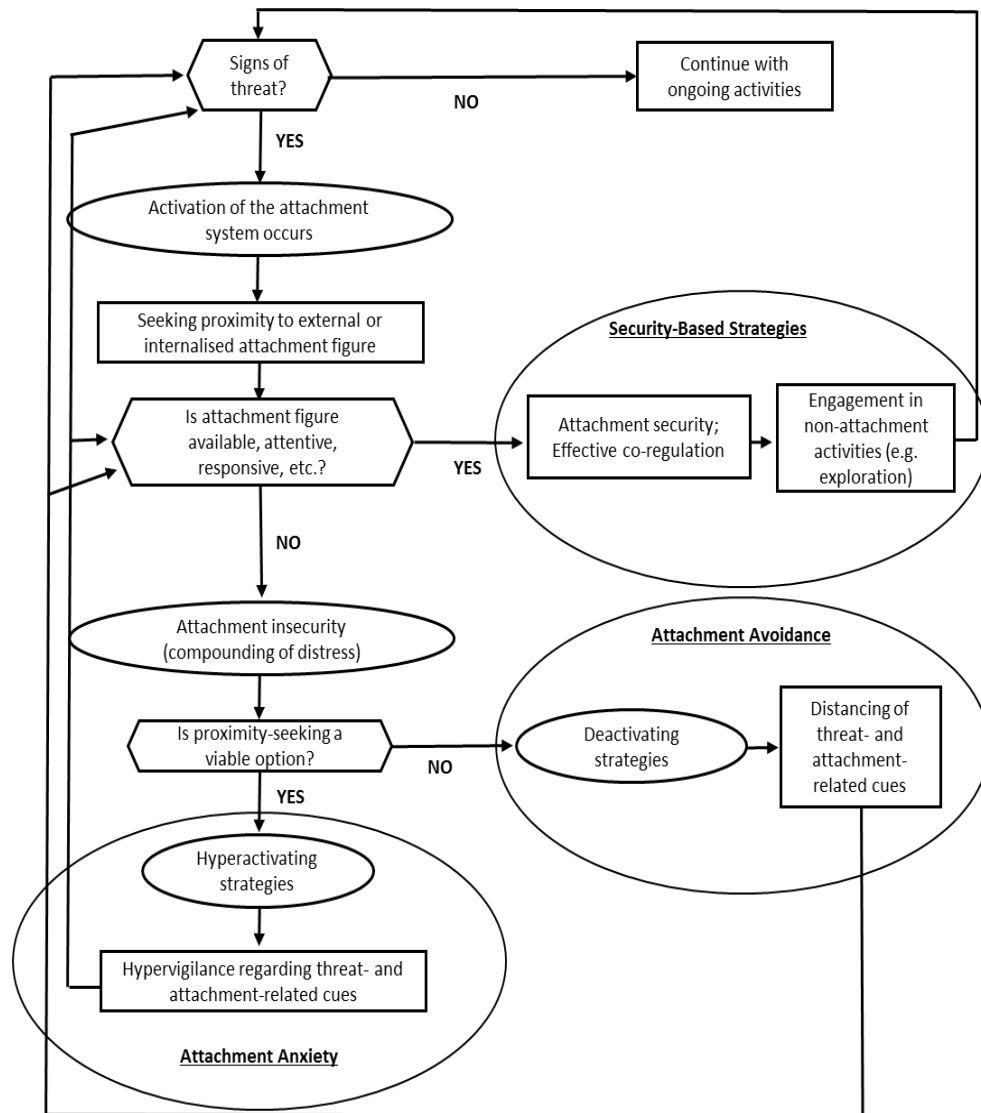


Figure 3. An integrative model of the activation and dynamics of the attachment system (Shaver & Mikulincer, 2002)

The positive internal working models of the self and others that are developed through a secure attachment relationship provide an individual with the ability to appraise emotionally threatening situations to alleviate associated distress (Mikulincer & Shaver, 2003). For example, their positive cognitive representations allow them to perceive negative situations as short-term or as controllable,

changeable and tolerable. This approach allows the emotion to run its course without interruption, thus preserving the functional aspects of emotion and aiding healthy psychological functioning (Lazarus, 1991; Shaver & Mikulincer, 2007).

However, in the absence of a responsive and available attachment figure, activation of the attachment system can lead to one of two secondary maladaptive emotion regulation strategies: hyperactivation and deactivation. Mikulincer and colleagues (2003) suggest that these strategies come into play dependent upon whether the individual determines, consciously or subconsciously, that proximity seeking (a 'primary' regulation strategy) is still a practical option (see figure 3). The outcome of this decision then determines whether the individual's attachment system is hyperactivated (if proximity seeking is still perceived to be viable) or deactivated (if proximity seeking is seen as impractical). Attachment anxiety has been consistently linked with a hyperactivating strategy, while attachment avoidance has been empirically associated with the deactivation of the attachment system (Shaver & Mikulincer, 2007).

Attachment anxiety and hyperactivation

It is posited that those high in attachment anxiety perceive undesirable emotions as somewhat compatible with their goal of eliciting attention and support from those around them (Shaver & Mikulincer, 2007). It is therefore in their best interest to maintain chronic activation of the attachment system by prolonging and amplifying

negative emotions. This hyperactivating strategy is associated with an obsessive focus towards threatening stimuli, referred to by Bartholomew and Horowitz (1991) as a process in which excitatory pathways amplify the monitoring of potential attachment-related threats, leading those high in attachment anxiety to perceive threats in the majority of situations and interactions. This often also involves behavioural overreactions to potentially threatening situations as a purposeful method of achieving attention from an attachment figure (Cassidy & Berlin, 1994; Mikulincer & Florian, 1998). By putting forth the semblance of helplessness and vulnerability, attachment figures may be more likely to offer support and threat protection for the individual.

In contrast to securely-attached individuals, those high levels of attachment anxiety have low levels of self-efficacy where self-regulation is concerned (Shaver & Mikulincer, 2007), which hinders their ability to access and implement adaptive emotion regulation strategies (Hwang, 2006). This low self-efficacy is developed as a result of an invasive parenting approach, in which the attachment figure responds overbearingly, negatively and/or inconsistently to any emotional signals displayed by the infant, thus interfering with the development of self-regulatory skills and advocating a sense of learned helplessness and ineptitude in terms of the processing and management of emotion (Mikulincer, Shaver & Pereg, 2003). This learned helplessness, and a perception of negative events as being out-with one's control, is fuelled over time through the negative internal working model of self, ingrained in those high in attachment anxiety (Collins & Read, 1994; Shaver & Clark, 1994),

which is characterised by a perception of the self as incapable and powerless in previous and future situations.

This strategy has been demonstrated to strengthen negative feelings about a given situation, increase rumination over attachment concerns and generally maintain internal working model activation even in the absence of external threats (Mikulincer et al., 2003). Shaver and Mikulincer (2002) suggest that the negative emotional memories of those high in attachment anxiety are closely bound together in a highly accessible negative associative memory network, meaning that the activation of one negative memory can often result in an overwhelming flood of negative emotional recall. Shaver and Mikulincer refer to this as a “chaotic mental architecture pervaded by negative emotion” (Shaver & Mikulincer, 2007, pp. 454). Mikulincer and Orbach (1995) explored the relationship between adult attachment and access to early emotional memories involving sadness, happiness, anxiety and anger in a sample of 120 students categorised as either secure, avoidant or ambivalent. In this study, participants were instructed to recall one memory for each emotion specified above. Once recalled, they were told to hold each memory in their mind, and attempt to recall as clearly as possible their emotional experience at the time that memory occurred, rating their experience for each memory on the following items: angry, sad, embarrassed, fearful, anxious, disgusted, ashamed, depressed, surprised, and happy. Their findings support the proposal that those classified as anxiously attached (aka. ambivalent) have trouble repressing instances of negative emotionality, can easily retrieve negative emotional memories and

struggle to curb the proceeding influx of negative memory activation and negative affect. However, it must be noted that, as with many studies that apply a categorical approach to attachment, the number of participants considered to be ambivalent was relatively low ($n = 15$). The small number of participants in this sub-group, compared with the number of secure participants ($n=71$) may have impacted on the outcome of the two-way ANOVAs conducted to detect group differences, as an unequal sample size can affect the homogeneity of variance assumption required for this type of analysis. Further, as the effect sizes are not reported by the authors, it is difficult to determine the impact that this may have had on the power of the effects detected. Despite its potential limitations, this study provides an indication that those who are considered anxious/ambivalent may struggle with increased access to negative emotional memories, and the emotional experiences associated with them.

This inability to inhibit or contain negative emotions has been found to result in the excessive outward expression of undesirable emotions in those high in attachment anxiety. Wei, Vogel, Ku and Zakalik (2005) investigated the relationship between attachment anxiety and both negative mood and interpersonal issues in a sample of 229 undergraduate students. Unlike Mikulincer and Orbach (2005), Wei and colleagues utilised a dimensional measure of attachment (The Experience in Close Relationships Scale; Brennan et al., 1998), thus alleviating the issue of low sub-group numbers. Their findings revealed that the dysregulation of negative affect (evidenced by high emotional reactivity, a construct which reflects emotional flooding, emotion lability and hypersensitivity to emotions) was a significant

mediator in the relationship between attachment anxiety and both interpersonal problems and negative mood. The relationship between attachment anxiety and increased emotional reactivity has also been documented in other studies (Lopez, 2001; Wei et al., 2003). These findings suggest a propensity towards the under-regulation of emotion in those high in attachment anxiety, resulting in an increase in emotional experience (i.e. physiological arousal) and a flood of emotional expression (i.e. outwardly expressed emotion).

Furthermore, Ognibene and Collins (1998) considered the relationship between adult attachment and strategies for coping with distress in a general population sample (n=81), in which participants were asked to indicate how they would respond or 'cope' with a variety of hypothetical stressful situations. Their findings support the idea that those high in attachment anxiety rely on others to regulate their distress for them, as they reported excessive support seeking to alleviate negative affect. Attachment avoidance, on the other hand, was associated with less likelihood of support seeking, but with a tendency to withdraw or distance themselves from the situation. This supports the proposition that those high in attachment anxiety do not feel competent in their self-regulatory ability, and thus rely exclusively on seeking proximity and support from others to regulate undesirable states, whereas those high in attachment avoidance opt to avoid or deny distressing experiences rather than depend on external support.

However, contrasting findings were demonstrated in Collins and Feeney's (2000) investigation of the relationship between support seeking and adult attachment in a sample of 93 dating couples. In this study, one member of the couple (the 'support seeker') was asked to present a recent stressful experience or problem to their romantic partner (the 'caregiver'). Support seekers were instructed to select a problem that had not directly involved their partner, to avoid conflict of interest in support provision. Mood was measured before and following the discussion, and participants were also asked to complete a questionnaire assessing their opinion of the interaction that had taken place. The recorded discussions between couples were coded by the researchers to identify support seeking behaviours and caregiving responses. Again, attachment avoidance was negatively associated with support seeking behaviours during the distressing discussions. However, attachment anxiety was unexpectedly unrelated to support seeking behaviours, but predicted more negative caregiving behaviours, less instrumental support and lower responsivity to partner's attempts at support seeking in the caregiving partner.

Collins and Feeney (2000) suggest that the lack of relationship between attachment anxiety and support seeking behaviours may have been a result of a weak coding scheme, but also raise the suggestion put forth by Fraley and Shaver (1998); that attachment anxiety is more significantly related to the appraisals of a specific interaction, rather than the behavioural response to that interaction (which they argue is associated more specifically with attachment avoidance). However,

the reason for this unexpected finding is may also be down to the relatively limited number of participants demonstrating high levels of attachment anxiety and attachment avoidance, as their sample reported being relatively secure across the board (Collins & Feeney, 2000). Further, in contrast to Ognibene and Collins (1998), this study used a relationship-based experimental design, which may explain the difference in findings. The differences in approaches taken may suggest that those high in attachment anxiety might report an intention to seek support in times of distress, but that their conflict about the availability of their partner may hinder their actual execution of this behaviour. Therefore, in a relationship context, this study can be seen to provide support for the proposition that attachment avoidance is associated with lower levels of support seeking to regulate distress, while attachment anxiety is associated with poor caregiving provision possibly indicating an inability to effectively regulate the distress of others. However, further research may benefit from considering both dispositional support seeking and actual support seeking behaviours in distress-inducing relationship situations to determine whether there are differences between ones perceived/intended strategy of coping and their actual behaviours.

Together, these findings support the theoretical association between attachment anxiety and the under-regulation of emotion, often accompanied by higher levels of negative affect and emotional expression or flooding, hypervigilance even in the absence of threats, a consistently activated negative emotion memory network and a tendency to rely on those around them to assist in regulating their

emotional states for fear that they are not capable of achieving this goal independently.

Attachment avoidance and deactivation

In contrast to the hyperactivation strategy associated with high in attachment anxiety, attachment avoidance has been associated with chronic conscious or unconscious attempts to maintain attachment system deactivation, so as to minimise the potential emotional consequences of everyday situations, and the distress or frustration that may arise from attempts to access an unavailable attachment figure (Cassidy & Kobak, 1988). The use of deactivation is supported by studies in which attachment avoidance has been associated with an inattention to potentially distressing situations and a tendency to repress distress when it does arise (Caldwell & Shaver, 2012; Fraley et al., 2000a; Mikulincer & Shaver, 2003; Fuendeling, 1998). For example, Fraley and colleagues (2000a) conducted two studies in which separate samples of 102 and 229 undergraduate students listened to a 20-minutes interview that included the discussion of attachment-related experiences (e.g. intimacy, separation and loss). After listening to the interview, participants were asked cued-recall questions directly after the interview (study 1) and after up to 21 days later (study 2). While study 1 indicated that those high in attachment avoidance recalled less attachment related information than those high in attachment anxiety, suggesting that these individuals were less attentive to this information, study 2 aimed to clarify whether this was an issue of attention (i.e.

encoding) or recall. The findings of study 2 suggested that recall was equally poor for those high in attachment avoidance following a delayed time-period, suggesting that they did not forget the attachment-related information any faster than those high in attachment anxiety. This indicates that the deactivating strategy associated with attachment avoidance may cause these individuals to initially encode less emotional information than those who are secure or high in attachment anxiety, perhaps by concealing threatening emotional information from awareness. However, in study 1, the time between the end of the interview and the recall test is not specified, and so it is possible that the information was encoded, but that suppression methods came in to play to block memory access or retention.

Further, a relationship has been demonstrated between attachment avoidance and emotional cut off (a construct that reflects the perception of close interpersonal relationships as threatening and a tendency to inhibit emotional experiences when they are deemed to be too intense; Wei et al., 2005) and a propensity to abstain from interpersonal involvement and suppress emotional experiences (Mikulincer & Shaver, 2003; Pietromonaco, Feldman Barrett & Powers, 2006).

Shaver and Mikulincer (2002) suggest that deactivation can regulate emotion by either pre-emptively directing attention away from emotional input (i.e. attention deployment), or by post-emptively suppressing (consciously or subconsciously) information and memories that have already been encoded so as to

avoid the onset of, or minimise, emotional distress. In terms of the former, those high in attachment avoidance, in contrast to those high in attachment anxiety, tend to inhibit threat monitoring and minimize the importance of external support (Kobak, Cole, Ferenz-Gillies, Fleming & Gamble, 1993), in favour of self-reliance.

In line with this, a number of studies discussed herein suggest that those high in avoidance do experience suppressed emotions below the surface, suggesting that the information is encoded, but its access is restricted and its existence is outwardly denied (Dozier and Kobak, 1992; Mikulincer and Orbach, 1995). Indeed, Mikulincer and Orbach's (1995) study of adult attachment and emotional memory accessibility found that those who were avoidantly attached demonstrated a defensive approach to emotional memory recall and had trouble accessing negative emotional memories, while memories that were reported were relatively shallow. Furthermore, Dozier and Kobak (1992) found that, in a sample of 50 college students, those classified as avoidant recalled few negative emotions during the Adult Attachment Interview, but demonstrated an increase in physiological reactivity, as indicated by increased skin conductance levels, during attachment-related dialogues (e.g. those prompting discussion of rejection and separation from caregivers). This suggests that, while suppression may effectively dampen the expression of emotion, it is less effective at suppressing the overall emotional experience.

Attachment avoidance is also associated with a reluctance to acknowledge

personal faults or weaknesses, suggesting a somewhat higher level of self-efficacy in terms of the emotion regulatory abilities than those high in attachment anxiety (Mikulincer, 1998), even though their methods may be maladaptive. This is thought to develop from an attachment relationship where signs of emotional weakness are responded to negatively (Cassidy, 1994). In instances where emotional input cannot be avoided, those high in avoidance will often make attempts to suppress the emotion that has been initiated (whether it is positive or negative) to re-achieve deactivation and avoid appearing vulnerable (Mikulincer & Shaver, 2003). Mikulincer suggests that this approach is favoured by those high in attachment avoidance because a more engaged, problem-solving approach leads to more potential for identifying personal weaknesses and jeopardising one's competent and independent façade (Mikulincer, 1998). A meta-analysis of neuroscience studies also supports that avoidant individuals use suppression as a preferential method of emotion regulation (Vrticka and Vuilleumier, 2012), as it allows them to keep the attachment system deactivated and prevents others from seeing their emotional vulnerabilities (Mikulincer & Shaver, 2007).

Moreover, deactivation in those who are high in attachment avoidance is further supported by studies that demonstrate reduced activation in brain regions linked with responsivity to rejection-related distress (i.e. the dorsal anterior cingulate cortex and anterior insula; DeWall, Masten, Powell, Combs, Schurtz & Eisenberger, 2012). Mikulincer and Sheffi (2000) suggest that, over a long period of time, this type of deactivation strategy could lead to a generic disregard for any type

of emotional experience, as individuals endeavour to deny emotional stimuli, 'tune out' to their own emotional reactivity, and withhold the outward expression of emotion (Kobak et al., 1993; Shaver & Mikulincer, 2007). Research using a Remote Associates Task, in which 350 student participants were shown three words and had to correctly identify the fourth word that linked the original three, found that those high in attachment avoidance performed equally well after both neutral and positive affect induction (Mikulincer & Sheffi, 2000). This was in contrast to secure individuals, whose performance improved when positive affect was induced, and those high in anxious attachment, whose performance was impaired after the induction of positive affect. However, it must be noted that positive affect in this study was induced using positive memory recall. As mentioned previously, those high in attachment avoidance have been found to struggle with the recall of emotional memories, particularly those with attachment-relevance. Therefore, it is possible that those high in attachment avoidance were less able to recall positive emotional memories, and such were not sufficiently affected by the positive mood-induction procedure in a way that would impact on their performance abilities.

A further series of studies in which 200 (study 1) and 100 (study 2) participants were asked to continuously write about their thoughts and feelings while either actively thinking about or suppressing the thought of their partner leaving them for someone else found that avoidant individuals are more successful at using suppression than those lower in attachment avoidance, when success is measured by both an absence of separation-related thoughts in participants' writing

(study 1), and a lack of physiological arousal during the task (study 2) (Fraley & Shaver, 1997). The use of implicit outcome measures in this study, as opposed to self-reported emotional outcomes, increases the validity of this research in terms of uncovering unconscious separation-related thoughts and physiological reactivity. However, as the researchers used a counter-balanced within-subjects design, those who took part in the express procedure first may have experienced some infiltration from the emotions experienced during the first part of the procedure throughout the remainder of the experiment. This 'leftover' emotional experience may have impacted on the likelihood of separation-related thoughts and increased physiological arousal still being present following the suppression section of the procedure. Despite this, attachment related differences were still uncovered between the conditions, suggesting that this may not have had a significant impact on the results. Therefore, in combination with previous studies, these findings provide further support for the suppression of both positive and negative emotional information in those high in attachment avoidance, and suggests that the use of deactivation may distort emotional memories and prevent the build-up of associated memory networks over time, decreasing the propensity for affect to influence or interfere with cognitions and information processing (Fraley et al., 2000a; Mikulincer et al., 2003; Mikulincer & Shaver, 2003).

Neurological research also indicates that those high in attachment avoidance appear to process positive attachment-related information in the right hemisphere (Cohen & Shaver, 2004), an area most commonly linked with negative emotion

processing and withdrawal (Davidson, 2004). This was only the case for positive attachment-related information, but not for positive nonattachment-related information. Rognoni and colleagues (2008) found similar results for happy, sad and fearful attachment-related stimuli, when participants were measured on EEG frontal asymmetry and self-reported emotional arousal both at rest and during movie clips intended to induce the above emotions. This suggests an association between attachment avoidance and globally diminished emotional arousal, and a tendency to specifically process attachment-related emotional stimuli. This provides further support that those high in attachment avoidance report low emotional arousal for both attachment- and nonattachment-related emotional material, but specifically treat all attachment-related information, whether positive or negative, as threatening. Further, this suggests that attachment-related emotional information may prompt more significant attempts at suppression in these individuals.

More recent research by Mikulincer, Dolev and Shaver (2004) involved two between-subjects investigations (study 1: $n=120$; study 2: $n=200$) in which participants were asked to suppress the memory of a painful relationship breakup before taking part in a Stroop task, with reaction time as the outcome variable. In both studies, half of the participants conducted the Stroop task whilst recalling a 1-digit number out loud repeatedly (low cognitive load), while the other half conducted the Stroop task whilst recalling a 7-digit number out loud (high cognitive load). In study 2, positive and negative self-descriptive traits (personally identified by each individual participant 2-3 weeks previously during a lecture session) were

used in the Stroop task to determine whether suppression had differing impacts depending upon whether the individual was exposed to negative or positive self-traits. Mikulincer et al., (2004) found that while avoidant individuals are able to successfully maintain suppression of painful break-up memories and inhibit access to negative self-traits to perform well during a simple Stroop task, they were unable to do so when a more cognitively demanding task was introduced into the procedure, resulting in poor performance (Mikulincer, Dolev & Shaver, 2004). In other words, this higher cognitive load increased their access to separation-related thoughts and memories, and negative self-traits, both of which were previously inaccessible. This suggests that suppression is a cognitively demanding task in itself, which may not be successful in situations where cognitive process is directed elsewhere.

Some studies also indicate that while attachment avoidance is related to low negative affect, it is also associated with impaired emotional clarity and a deficiency in labelling emotion both in the self and in others (Caldwell & Shaver, 2012; Wearden et al., 2003). This is similar to the findings reported by Spangler and Zimmermann (1999), in which adolescents were shown emotional movie clips and asked questions regarding the emotional quality of the clips while their facial responses were recorded using electromyography. The frown muscles of avoidant individual were observed to be mildly activated throughout all of the emotional scenes, regardless of whether the scene was positive or negative. This may suggest that the outward expression of both negative and positive emotions were being

suppressed by these individuals. Collectively, these findings also imply that while suppression may at times serve the goal of avoiding the distress associated with emotional situations in the short term, it may lead to a reduced clarity and understanding of the differential intentions and implications of emotions in a more general sense in the longer term (Shaver & Mikulincer, 2007).

While the research above supports an association between attachment avoidance and the deactivation of the attachment system through emotion suppression, Mikulincer (1998) suggests that avoidant attachment is also specifically related to problems using reappraisal techniques effectively. This is thought to be a result of the reluctance in these individuals to admit errors in thinking or behaviour and a lack of openness to new information, as mentioned above. In the coping literature, however, research surrounding attachment avoidance has been fairly inconsistent, with some studies suggesting that avoidant individuals take part in similar appraisal techniques to those high in attachment security when coping with stressful events (Shaver & Mikulincer, 2007).

However, other research suggests that attachment avoidance is related to distress-intensifying patterns of appraisal, similar to that of highly anxious individuals, when confronted with severe and unavoidable traumatic events (Berant et al., 2001; Mikulincer & Florian, 1998). Therefore, it is possible that longer and more intense periods of distress have a detrimental effect on the defences ordinarily used by those high in attachment avoidance, causing them to consequently behave

in a similar way to their anxious counterparts (i.e. those high in attachment anxiety). This further supports the theory that suppression can break down under considerable cognitive pressure.

These studies above provide clear evidence for substantial attachment-related differences in emotion regulation. Attachment anxiety is consistently associated with a hyperactivation strategy, in which vigilance towards emotional threats is chronically enhanced and emotional information is purposefully (whether consciously or unconsciously) left unregulated by the self with the goal of achieving attention and support from potential attachment figures who may provide a regulatory function (e.g. Bartholomew & Horowitz, 1991; Cassidy & Berlin, 1994; Mikulincer et al., 2003; Mikulincer & Florian, 1998; Wei et al., 2005). Contrastingly, attachment avoidance is characterised by a deactivation strategy, in which emotional threats are ignored or evaded and emotional responses are suppressed with the goal of maintaining a competent and self-sufficient veneer, thus denying emotional involvement in relationships and the need for interpersonal closeness (e.g. Cassidy & Kobak, 1988; Caldwell & Shaver, 2012; Fraley et al., 2000; Kobak et al., 1993; Mikulincer & Shaver, 2003; Wei et al., 2005).

While these strategies are in line with the differential goals of each insecure attachment dimension, both have been identified as maladaptive, as the under-regulation seen in those with high levels of attachment anxiety has been found to lead to increased levels of negative affect, constant rumination over adverse events

(whether real or perceived), and chronically activated access to a flood negative emotional memories (Mikulincer, Birnbaum, Woddis & Nachmias, 2000; Mikulincer & Florian, 1998; Mikulincer, Gillath, & Shaver, 2002; Mikulincer et al., 2003), whilst the suppression technique associated with attachment avoidance hinders the adaptive use of emotions in decision making processes, interferes with memory encoding and retrieval, is often accompanied by an increase in physiological reactivity and requires substantial cognitive effort (rendering it subject to breakdown when other cognitive demands are in place) (Berant et al., 2001; Fraley et al., 2000a; Mikulincer & Florian, 1998; Mikulincer and Orbach, 1995; Mikulincer & Shaver, 2003; Mikulincer et al., 2003; Mikulincer et al., 2004; Shaver & Mikulincer, 2007).

However, while it is clear that widespread empirical attention has been given to attachment-related differences in emotion regulation, the majority of literature has focused on the regulation of negative or positive affect more generally, with less attention to the strategies used to regulate discrete emotions (e.g. anger), limiting further development of the emotion regulation model of attachment. As research suggests that emotion type can have a significant impact on regulatory decision making (Zeman & Shipman, 1997), it is important that attachment research expands in this area. A modest number of studies do provide preliminary evidence for attachment-related difference in the regulation of anger and these will be discussed in the subsequent chapter on attachment and the experience and expression of anger.

2.3. Attachment-related differences in the experience and expression of anger

“The most violently angry and dysfunctional responses of all, it seems probable, are elicited in [those] who not only experience repeated separations but are constantly subjected to the threat of being abandoned.”
John Bowlby.

The aim of this chapter is to provide an overview of the current literature surrounding the expression and regulation of anger, in the context of attachment. Firstly, a discussion of the affective and cognitive aspects of anger will be presented, followed by the consideration of literature evidencing a potential association between attachment insecurity and behavioural anger expression (i.e. aggression). Consequences of maladaptive anger regulation will then be considered, followed by a discussion of the current state of the literature on attachment insecurity and the regulation of anger.

The experience of anger fundamentally serves an adaptive function, signalling to an individual that a real threat may be present in their environment and that they must take action to protect themselves (Kemper, 1987; van Dijk, van Kleef, Steinel & Beest, 2008). However, when anger is indiscriminate, and applied to contexts other than those in which it serves an adaptive function, the inappropriate expression of anger and its behavioural manifestations as aggressive or violent behaviour have been associated with a wide range of negative consequences for emotional well-being, social relationships and general social adjustment including

hyperarousal and maladaptive behaviours (Lazarus, 1996; Mauss, Bunge & Gross, 2007). Circumstances notwithstanding, individual differences in the experience and expression of anger are thought to be dispositional, in that they are relatively consistent across the lifespan (Schum, Jorgensen, Verhaeghen, Sauro & Thibodeau, 2003). Dispositional anger expression has been proposed to comprise three related but distinct components: i) emotion/affect (i.e. trait anger; the tendency to experience angry feelings); ii) cognition (i.e. hostility; feelings of bitterness and suspicion of others); and iii) behaviour such as physical and verbal aggression (Buss & Warren, 2000). While the terms 'anger' and 'hostility' are at times used interchangeably within the literature, the two constructs do differ. 'Anger' refers to the qualitative experience of anger, reflecting the extent to which one generally feels angry on a day-to-day basis (Buss & Perry, 1992). Hostility, on the other hand, is described by Buss and Perry as "the cognitive residual of ill will, resentment, and perhaps suspicion of others' motives" that closely follows the experience of anger (Buss & Perry, 1992, p6). In other words, anger is the emotion experienced by the individual, and hostility is their cognitive appraisal of that emotional experience.

Affective and cognitive aspects of anger expression

Bowlby theorised that dysfunctional anger is a strong correlate of insecure attachment. He suggested that when an individual is consistently rejected by their attachment figure, they develop an avoidant pattern of behaviour. As this avoidance competes with their underlying desire for proximity, angry feelings and

behaviour are likely to become prominent (Bowlby, 1988). Theoretically, this suggests that those high in avoidant attachment may be more likely to experience intense anger. Two studies have considered the relationship between parent attachment and anger, using the AAI. In a sample of 53 first year undergraduates, Kobak and Sceery (1988) found that those who were classified as dismissing avoidant were reported to be more hostile by their peers (using peer Q-sort ratings) than those who were classified as secure or preoccupied. Surprisingly, there were no differences in other-reported hostility between secure and preoccupied individuals. However, there is often low consistency between other- and self-reports of negative behaviours (e.g. arguing; Vazire & Mehl, 2008), even when the rater is a close friend or family member. Nonetheless, in an observational study, Kobak and colleagues (1993) found that, during interactions with their mothers, adolescents who were generally insecure showed more angry and hostile behaviours (verbal, nonverbal and overt attacking behaviours) towards their mothers during a dyadic problem solving task than those who were secure. This suggests both dimensions of attachment insecurity may be associated with increased anger expression. Accordingly, Meesters & Muris (2002) found this to also be the case in a sample of young females ($n=139$), in which self-report methods were used to determine the relationship between attachment and aggression. They found that insecure attachment was related to elevations in anger-related emotion and cognition, reporting higher levels of anger and hostility than those classified as secure. Muris and colleagues (2004) also found that, in secondary school students, self-reported insecure individuals indicated higher levels of aggressive anger and

hostility, and reported higher levels of trait anger, than those identified as secure. However, as mentioned alongside previous categorically-based studies of attachment, this study had a substantially lower number of insecure participants (secure = 405; avoidant = 11; ambivalent/anxious = 25). Nonetheless, both avoidant and ambivalent adolescents were significantly higher in self-reported anger and hostility at $p < .001$.

As hostility reflects negative expectations and beliefs about others, it is theoretically plausible that these high levels of hostility are often identified alongside both attachment anxiety and attachment avoidance because both dimensions are characterised by negative internal working model of others (Muris et al., 2004). Research demonstrates that those with higher levels of hostility tend to have more intense physiological responses to anger inducing situations than those who are low in hostility, including elevated blood pressure and increased heart-rate (Eckhardt & Deffenbacher, 1995; Fredrickson, Maynard, Helms, Haney, Siegler & Barefoot, 2000; Suarez & Williams, 1989), which may suggest that those higher in attachment anxiety and attachment avoidance, both of which have been associated with hostility, may also experience anger more intensely than securely attached individuals. However, as the samples used in these two studies revealed relatively small numbers of avoidant and anxious people, they combined them to reflect generally insecure attachment. They also rely exclusively on measures of attachment to a parent, as opposed to attachment in the context of adult romantic

relationships. Therefore, their findings offer limited insight into adult attachment-related differences in trait anger and hostility.

Using a categorical measure of adult attachment, Troisi & D'Argenio (2004) revealed that, in a sample of 87 young men with depressive symptoms, preoccupied and fearful avoidant individuals self-reported significantly higher levels of trait anger than those who were secure or dismissing. The authors did not identify any significant differences between preoccupied and fearful individuals, or secure and dismissing in this study. This suggests that the attachment anxiety dimension may be an especially salient risk factor for increased dispositional anger, over and above attachment avoidance, indicating that attachment avoidance is only related to increased dispositional anger when levels of attachment anxiety are also high. However, as this study used a sample of clinically depressed male participants only, this restricts the generalisability of their results to a wider non-clinical population.

Mikulincer (1998) investigated this further by conducting a series of studies looking at the relationship between attachment style and anger in Israeli undergraduate students. First, he investigated attachment differences in anger-proneness, anger-related goals, anger expression and responses to anger (n=100). Attachment was measured using the Attachment Style Scale (Hazan & Shaver, 1987) which requires participants to read three attachment-style related descriptions and select which reflects their own attachment style most closely. This study adopted an anger-recall paradigm to induce feelings of anger, in which participants were asked

to write about a recent incident that caused them intense anger. Following this, they completed a 32-item scale questionnaire about their cognitive and emotional reactions to that incident, which measured anger control, anger-related goals, anger-related responses, and anger-related emotions (Experience of Anger Scale; Averill, 1982). Participants also completed the Multidimensional Anger Inventory (MAI; Siegel, 1986) which measures frequency, duration, and magnitude, mode of expression, hostile outlook, and range of anger-eliciting situations. It was found that those classified as avoidantly attached showed higher levels of anger control, and higher escapist response tendencies, whereas those who were anxiously attached reported lower levels of hostility, and higher levels of anger and negative affect.

Furthermore, Mikulincer (1998) carried out an additional study (n=30) in which participants were given a number of hypothetical anger-inducing relationship scenarios, which varied by the partner's level of hostile intent during the episode (i.e. hostile, ambiguous and non-hostile). Self-report and physiological arousal data (heart-rate variability) were collected to identify whether those high classified as avoidant experienced as little arousal during anger induction as they reported in the previous study. Those who were avoidantly attached were found to report lower levels of anger than secure and anxious individuals in all three conditions, but also showed the highest levels of physiological arousal in all three conditions. Avoidant individuals were also the only group to attribute high levels of hostile intent in all three conditions indicating that their hostile attitudes ensue, even when there are clear indications that the perpetrator's acts were not hostile. Again, this supports

the proposition that attachment anxiety, in particular, may be associated with increased trait anger; while attachment avoidance appears to be more closely associated with hostility. While Mikulincer's research offers keen insight into the relationship between adult attachment and anger, the cultural implications of his sample needs to be taken into consideration. European cultures tend to be more individualistic, and are thought to be concerned mostly with experiencing positive emotion, and minimising the experience of negative emotions. Israel, on the other hand, is considered to adopt more of a collectivist culture, with more openness to the experience of both positive and negative emotions, and value placed more heavily on finding a balance between the two (Kityama, Markus & Kityama, 1999). Therefore, it is possible that the participants used in these studies may be more amenable to the experience of anger than those from a UK-based sample, which may have impacted on their propensity to experience, or admit experiencing, anger-based emotions.

Findings similar to that of Mikulincer were found in research carried out by Dutton and colleagues (1994) in a sample of North American males who were currently undergoing treatment for intimate partner violence. Using self-report measures and a correlational design, they found that a combination of high attachment anxiety and attachment avoidance was most strongly associated with reported experience of anger and jealousy in romantic relationships, followed by high attachment anxiety alone. This finding led the authors to propose that fearful attachment (i.e. the combination of high attachment anxiety and high attachment

avoidance) could be more accurately referred to as 'angry attachment'. This is supported by other similar findings, such as that of Critchfield and colleagues (2008), who found that, in the context of Borderline Personality Disorder, patients were more likely to exhibit hostile and aggressive behaviour if they were high in both attachment anxiety and attachment avoidance. This study also found attachment anxiety alone to be characterised by higher levels of trait anger (Critchfield et al., 2008). Once again, it must be noted that both of these studies were conducted with samples that could be considered more anger- and aggression-prone than a normative general population sample (i.e. intimate partner violence perpetrators and those diagnosed with Borderline Personality Disorder), which could be seen to intensify the attachment-related differences identified, and could also suggest an over-representation of insecure attachment dispositions. However, a study conducted by Kidd and Sheffield (2005) found similar results in a non-clinical British sample, alleviating the sample limitations of previous studies. In self-report study conducted with a sample of 191 British undergraduates, Kidd and Sheffield found that preoccupied attachment demonstrated the strongest relationship with trait anger, followed by fearful attachment (high attachment anxiety + high attachment avoidance), while dismissive and secure attachment had similar relationships with trait anger. These findings seem to suggest that anxious attachment may be the strongest risk factor for high levels of trait anger, and that this risk increases when combined with equally high levels of attachment avoidance. However, it is still unclear whether attachment avoidance independently predicts trait anger, in the absence of high attachment anxiety.

Research carried out by Pederson (1999) investigated self-reported hostility and aggression in a sample of 196 American undergraduate Psychology students currently in a romantic relationship and found that those with attachment styles characterised by a positive self-concept and low levels of attachment anxiety (i.e. secure and dismissing) reported lower levels of both aggression and hostility than those with a negative model of the self and high levels of attachment anxiety (i.e. fearful and anxious). This is theoretically intuitive, as those high in attachment anxiety are more overtly reactive to perceived threats (Mikulincer et al., 2003), and hostility and aggression often present as behavioural reactions to threatening situations.

However, the fact that aggression was measured using self-report questionnaires leaves some questions unanswered. For example, as found by Mikulincer (1998), those high in attachment avoidance often suppress their emotional expressions to avoid appearing vulnerable or emotionally invested, therefore their 'secure-like' levels of aggression and hostility may not indicate that they are free from these feelings, but rather that they are not willing to directly admit to them. Therefore, a more indirect measure of aggression may be more useful in identifying whether those high in attachment avoidance are likely to be aggressive in response to a threatening situation. Indeed, some studies suggest that avoidant individuals do outwardly express anger, but in indirect ways, even when anger arousal is not extreme (referred to as 'dissociative anger'; Mikulincer &

Shaver, 2005). For example, as outlined earlier, Mikulincer (1998) found that those high in attachment avoidance reported very low levels of anger after being provoked, but showed high physiological arousal and hostile attitudes towards the provoker. This suggests that the extremity of induced anger may not need to be particularly high to elicit a behavioural response in the form of hostility and aggression.

Taken together, this research suggests that those high in attachment anxiety are more likely to possess elevated levels of trait anger and potentially hostility. On the other hand, those high in attachment avoidance may be expected to display higher levels of hostility, in the absence of high levels of trait anger. However, there is significantly less empirical research on the relationship between attachment security and levels of behavioural aggression in a non-clinical population.

Behavioural components of anger

Two models have been proposed to explain the goals of aggressive behaviour: the cognitive content specificity model and the anger avoidance model (Gardner and Moore, 2008). The cognitive content specificity model suggests that unrealistic expectations and beliefs about others and their behaviour can lead to the emotional experience of anger and intense physiological reactivity. This has clear theoretical links to the internal working model of others possessed by those high in attachment-related anxiety. This model postulates that aggressive behaviour acts as a socially

constructed overt behavioural response to the experience of anger, with the goal of emancipating those angry feelings and alleviating the distress that comes with them (Kassinove & Tafrate, 2002). However, experimental research carried out by Bushman (2002) indicates that acting aggressively, or 'venting', may in fact cause an increase in the experience of anger, rather than reduce it. This model has also been challenged on the basis that it suggests that anger is a negative emotion, which must be avoided, thereby disregarding the potentially adaptive function of anger (Gardner & Moore, 2008).

The shortcomings of the cognitive specificity model led to the development of the anger-avoidance model (Gardner & Moore, 2008), which alternatively suggests that for those with impaired emotional processing and emotion regulation abilities, the experience of anger and the physiological change that comes with it can lead to either hostile rumination (internalised avoidance) or aggressive behaviour (externalised avoidance). It is important here to make the distinction between the use of the term 'avoidance' in relation to this model, which reflects the avoidance of anger, and the construct of 'attachment avoidance', which is used to capture the avoidance of attachment relationships. Gardner and Moore suggest that the goals of aggression in anger-avoiders differs from more instrumental forms of aggression in that it is reactive, and often activated in response to an external or internal threat (2008). The aim of aggression in this case is to reduce the experience of angry affect, whereas instrumental aggressors aim to achieve a desired goal by controlling or manipulating their environment. Gardner and Moore claim that these

controlling instrumental aggressors do not show any significant difficulties with emotion regulation, tend not to report early aversive experiences, and are less likely to show any significant physiological signs of anger. On the other hand, anger-avoidance aggressors are thought to use aggressive behaviour to escape from the experience of anger, are characterised by both an aversive early history and difficulties in emotion regulation, and show elevated levels of trait anger and anger reactivity.

This model of aggressive behaviour is conceptually congruent with attachment theory, as attachment insecurity is also characterised by negative early dyadic experiences and maladaptive emotion regulation. This suggests that when feelings of anger arise, and are perceived as threatening, those high in attachment anxiety and avoidance may use aggression as a means of reducing the experience of anger. This propensity towards a lack of effective anger control and a defensive 'fight' response to anger-inducing situations, is thought to be developed as a result of early learning and modelling experiences in childhood (Gardner & Moore, 2008), where aggression has perhaps been found to aid goal achievement in insecure individuals. Research also suggests that those with aversive childhood experiences have higher levels of trait anger (as measured by the State-Trait Anger Expression Inventory; Spielberger, 1988) and anger reactivity than those who were not subject to negative childhood influences (Gardner, Moore, Wolanin, Alm et al., 2006; Hardner, Moore, Wolanin, Deutsch, & Marks, 2006). This further supports a relationship between attachment insecurity and the experience and expression of anger.

The empirical literature that attempts to identify the ways in which attachment insecurity is associated with behavioural aggression, in the normal population, is sparse. However, there are specific areas of research in which the attachment-aggression link has been given more direct attention. For example, attachment insecurity has been well documented as a risk factor for relational violence, both in terms of being an abuser and a victim (Bartholomew & Allison, 2006; Mikulincer & Shaver, 2007; Senchak & Leonard, 1992). In a review of the literature, Mikulincer and Shaver (2007) found that attachment anxiety was consistently linked to higher levels of domestic violence across a diverse variety of samples. This is particularly true for anxiously attached men, who were found to react more frequently with extreme coercion and abusive behaviour during relational conflicts (Mikulincer, 2007). On the other hand, Bartholomew and Allison (2006) investigated the relationship style of a sample of abusers, and found that those who were classified as having an avoidant attachment style were more likely to respond to domestic conflicts with violence, and furthermore, that this likelihood was increased in relationships where the partner demonstrated an anxious attachment. Senchak and Leonard (1992) also found that more verbally aggressive behaviour was present during couple conflict when both, or one, of the individuals was insecurely attached.

As well as being a risk factor for the perpetration of domestic violence, both attachment anxiety and avoidance have also been found to predict domestic

violence victimisation (Mikulincer, 2007). However, the directionality of this relationship is somewhat unclear, as while being insecurely attached may be a risk factor for being involved in an abusive relationship, it is equally possible that involvement in an abusive relationship may lead to a rise in attachment insecurity as research indicates that negative experiences in adulthood have the power to evoke a shift in attachment security (Waters et al., 2000). Without further longitudinal investigation, this cannot be determined as of yet. However, this research suggests an association between domestic violence perpetration and attachment anxiety most specifically, which may suggest an increased aggression tendency in those high in attachment anxiety.

There is also extensive research on the relationship between insecure attachment and aggressive and antisocial behaviour in adolescents and young adults (Moretti & Obsuth, 2009). Moretti and Obsuth (2009) conducted a longitudinal study investigating the association between aggressive behaviour at two time points (two years apart) in a sample of adolescents aged 12-18, who were currently incarcerated. Participants were measured on two aspects of aggressive behaviour: overt aggression and relational aggression (as measured by the Form-Function Aggression Measure; Little, Jones, Henrich & Hawley, 2003). In this study, attachment was measured dimensionally, using the Family Attachment Interview (Bartholomew & Horowitz, 1991), a measure developed in line with the Adult Attachment Interview to assess attachment in adolescence. A significant interaction was found between gender and attachment anxiety, in that attachment

anxiety was related to increased overt and relational aggression in females, but not in males. Attachment anxiety was also a predictor of relational aggression in females at the two-year follow up time point. On the other hand, attachment avoidance was found to be a significant predictor of both forms of aggression for males in the initial testing session, and of relational aggression alone at the follow-up session. These findings suggest that while attachment anxiety may be a significant risk factor for aggression in females, attachment avoidance may have a stronger relationship with aggressive behaviour in males.

Insecure attachment is also consistently over-represented in institutional samples, but extreme forms of interpersonal aggressive behaviour and violence (e.g. rape and murder) are more often associated with a disorganised/unresolved style of attachment (Burk & Burkhart, 2003). Furthermore, in these samples, disorganised/unresolved attachment styles commonly present in parallel with more severe psychopathologies, such as narcissistic or antisocial personality disorders (Van Ijzendoorn et al., 1997), and/or a background of childhood abuse (Fonagy et al., 1996; Fonagy & Target, 1995). Attachment insecurity has also been identified as a risk factor for juvenile aggression and externalising behaviours, including early onset conduct disorder (e.g. Lyons-Ruth, 1996; Van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). However, the majority of studies identifying an association between attachment insecurity and behavioural aggression have been concerned with levels of attachment insecurity (or prevalence of insecure attachment categories, depending on the measurement approach used) in those who have

committed an offence or who are considered to be at high risk of violence. This leaves the question of whether attachment insecurity is a risk factor for aggressive behaviour in the normal population unanswered, and justifies the further investigation of this relationship in a non-offending population in this present thesis. However, importantly, the relationship between feelings of anger and the outcomes of these feelings (i.e. whether or not they are expressed aggressively) will depend significantly on how that anger is regulated.

The regulation of anger

The ability to regulate one's own emotions effectively is especially important in the case of anger, as the inappropriate expression of anger can have a negative impact on social relationships and has been linked to social maladjustment (Deffenbacher, 1992; Kubany et al., 1995; Lazarus, 1996; Mauss et al., 2007). An abundance of research indicates that when anger is either habitually suppressed or chronically under-regulated, it can result in negative outcomes for that individual's psychological and physical well-being (Mittleman, Maclure, Sherwood, Mulry, Tofler, Jacobs, Friedman, Benson, & Muller, 1995; Phillips, Henry, Hosie, & Milne, 2006; Siegman & Smith, 1994; Tice & Baumeister, 1993). Furthermore, research on violent and aggressive behaviour suggests that aggression is not only related to an inability to inhibit or control anger, but also to a chronic over-control and suppression of anger (Davey, Day & Howells, 2005). Therefore, both unregulated and suppressed anger may increase the likelihood of aggressive behaviour,

suggesting that attachment anxiety and attachment avoidance may both be risk factors for increased aggression, through the use of different anger regulation processes.

Spielberger and colleagues (Spielberger, Sydeman, Owen & Marsh, 1999) proposed a taxonomy of adaptive and maladaptive anger regulation processes. Adaptive anger regulation processes comprise reducing the occurrence of angry feelings through cooling off or relaxing so that they are not expressed aggressively ('anger control'). Maladaptive processes comprise the suppression of the outward expression of angry feelings ('anger-in'/suppression) and an inability to regulate the outward expression of anger such that it presents in excessive or inappropriate ways, such as through physical or verbal aggression ('anger-out'/under-regulation). Anger control differs qualitatively from anger suppression, in that the former successfully regulates both the internal experience and external expression of anger in a healthy and adaptive way, for example through self-calming or distraction, while suppression is characterised by ignoring or denying the emotional experience, and is often accompanied by elevated physiological arousal (Szasz, Szentagotai & Hofmann, 2011).

Excessive inhibition and suppression of anger experience and expression over time is thought to cause a build-up of anger arousal that can potentially result in an eventual outburst of severely violent behaviour (e.g. the 'over-controlled' offender; Megargee, 1970; Ogle, Maier-Katkin, & Bernard, 1995). Davey and

colleagues suggest that anger will arise in these individuals when arousal is extremely high as their psychological defences are not capable of managing such a high cognitive demand and their inhibition threshold is surpassed (Davey et al., 2005; Verona & Carbonell, 2000). Research in which self-reported data from 2697 participants data from the Young in Norway Longitudinal Study was analysed supports this hypothesis as the link between alcohol consumption and violence in dating relationships was found to be fully mediated by anger suppression, as measured by the anger-in subscale of the STAXI-2 (Speilberger, 1996), in that those who persistently use suppression to regulate anger (i.e. dispositional suppressors) were more likely to become violent after alcohol consumption (Norstrom & Pape, 2010). This supports the suggestion that suppression is inefficient in the presence of cognitive depletion (Mikulincer et al., 2004), as alcohol can serve to reduce cognitive capacity (Curtin, Patrick, Lang, Cacioppo & Birbaumer, 2001). This pattern is also seen in those high in attachment avoidance, whose use of suppression to regulate negative emotion, which is relatively effective in the short-term, has been shown to break down under extreme levels of stress or when complex cognitive tasks are introduced (e.g. Mikulincer et al., 2000, 2004; discussed in Chapter 2.2 of this thesis).

Some more historical studies have also shown that, within male criminal populations, those who suppress or over-control their anger, aggression and hostility tend to commit more severely violent crimes, which are often one-off and follow no prior history of violent behaviour (Blackburn, 1971; Megargee, 1970).

These over-controlled individuals show much lower rates of aggression in everyday interactions, and may appear relatively nonchalant or passive when faced with confrontational situations. However, over time, "the instigation accumulates to such a degree that the end result is an explosion of anger and violence well beyond the current level of provocation," (Verona & Carbonell, 2000, pp. 178-179). This again supports the short-term effectiveness of anger suppression, and the long term aversive consequences of its chronic use (e.g. externalising behaviours).

Following on from Megargee and colleagues, Verona and Carbonell (2000) investigated the relationship between over-controlled hostility, anger regulation and nature of offending in a sample of 186 female prisoners in American to identify whether this relationship was gender specific. Over-controlled hostility was measured using the O-H scale on the Minnesota Multiphasic Personality Inventory (MMPI), developed by Megargee, Cook and Mendelsohn (1967), and anger regulation was measured using the Anger Expression Scale (AX Scale; Spielberger et al., 1985), which contains subscales reflecting anger-in (suppression), anger-out (under-regulation) and anger control. They found that those in the one-time violent offender (OV) group had higher levels of over-controlled hostility than those in the repeat violent offender (RV) and non-violent offender (NV) groups (between which there was no significant difference in over controlled hostility). The OV offenders were also significantly more likely to have committed homicide than the RV offenders (56% and 31%, respectively). However, the OV offenders did not appear to be significantly different from the other two groups on measures of anger

regulation. This may be seen to suggest that the suppression of cognitive elements of anger (i.e. hostile cognitions) is more likely to result in aggressive behaviour than the suppression of its outward expression. However, it must be acknowledged that the women taking part in this study were all currently incarcerated, and thus may have been reluctant to self-report the under-regulation of anger honestly in a setting where the increased anger control is encouraged, the achievement of which may impact on their opportunities for release. However, while the mean anger-out score for NV offenders ($m=13.9$) was slightly lower than that identified for females in previous normal population samples ($m=14.09$; Spielberger et al., 1999), means for OV offenders (16.1) and RV offenders (16.2) were higher, suggesting that those who were incarcerated for violence-based offences did report higher levels of under-regulated anger.

In terms of negative health-related consequences, Mushtaq and Najam (2014) investigated anger-related risk factors for hypertension, and found that higher state and trait anger, a lack of anger control capabilities and the use of anger suppression were all significant predictors of elevated hypertension risk. Quartana and Burns (2007) also found that suppressing the experience and/or expression of anger was associated with a substantially heightened experience of pain during a cold pressor task (i.e. a cold water immersion task used to induce pain so that a variety of pain responses can be measured), suggesting that the chronic or dispositional suppression of anger may produce an ironic processing effect leading to an exacerbated experience or perception of pain (Quartana & Burns, 2007).

Further investigations by Burns, Quartana and Bruehl (2008) revealed that this relationship also existed for the state suppression of anger expression (i.e. suppression following instruction in a research setting), as those who suppressed the outward expression of anger during an anger provocation procedure reported high levels of pain. In addition, Burns, Johnson, Devine, Mahoney and Pawl (1998) also found that the use of anger suppression reduced patient responsiveness to pain management interventions (Burns, Johnson, Devine, Mahoney & Pawl, 1998). This literature adds additional support to the findings discussed in chapter 2.2, in which suppression was demonstrated to have especially negative outcomes, suggesting that those outcomes are not restricted to the elevated experience of emotion and the compromising of cognitive processes, but also extend to negative physical consequences.

Attachment and the regulation of anger

Theoretically it would be expected that those high in attachment avoidance would be more likely to inhibit anger, as research has linked attachment avoidance to emotion suppression as a consistent method of regulation for other emotions (Caldwell & Shaver, 2012; Fraley et al., 2000a; Mikulincer & Shaver, 2003). Similarly, one might assume that attachment anxiety would be associated with the same hyperactivating strategy in the context of anger as it has been found to in other emotional contexts (Bartholomew & Horowitz, 1991; Cassidy & Berlin, 1994; Mikulincer & Florian, 1998). In terms of attachment avoidance, displaying anger

within an interpersonal situation may indicate emotional investment in that situation, which contradicts their goal of complete independence and dismissal. (Cassidy & Kobak, 1988; Mikulincer & Shaver, 2007). Therefore, in order to maintain their appearance of superiority, individuals high in attachment avoidance may choose to suppress all emotional expression, including anger. With this view, it would make theoretical sense for these individuals to suppress their anger. However, the expression of anger may also serve to maintain distance between oneself and others, which may mean that under-regulating anger may also be goal congruent for these individuals.

Similarly, there are also some clear explanations for why an anxious individual would demonstrate a desire to internalise their feelings of anger, in spite of this being contradictory to their usual approach to emotion regulation. Those high in attachment anxiety may feel that expressing their anger will alienate their partner and threaten their relationship, which may in turn lead them to suppress anger in an attempt to avoid upsetting or losing their partner. Indeed, the growing body of research in the area of positive emotion regulation lends preliminary support to the theory of emotion-specific attachment-related differences in emotion regulation. For example, Goodall (2015) investigated the relationship between attachment insecurity and two positive emotion regulation strategies (savouring and dampening) in a sample of 174 UK-based participants between the ages of 18 and 73 (mean age = 32). Using self-report questionnaires, this correlational study identified both attachment anxiety (moderated by self-esteem)

and attachment avoidance to be significant predictors of dampening (i.e. reporting the use of suppression, distraction, fault finding and negative mental time travel when positive emotion arise), whilst attachment avoidance was a significant independent predictor of savouring (i.e. indicating the use of behavioural display, being present, capitalising and positive mental time travel during positive emotional experience) in a negative direction. This indicates that while those high in anxiety may outwardly express negative emotions in order to signal their need for supports (Bartholomew & Horowitz, 1991), in the context of positive emotion, the same goal may be better achieved through the down-regulation of emotion (and vice versa for attachment avoidance).

In line with this notion, Brenning and Braet (2013) took an emotion-specific approach to attachment-related differences in anger regulation, suggesting that the regulation strategies implemented by those high in attachment anxiety and attachment avoidance would likely differ in the context of anger. They suggested that while those high in attachment avoidance may be expected to suppress other negative emotions, leaving anger un-regulated may prove more useful in initiating withdrawal from others, thus achieving their goal of interaction avoidance. On the other hand, they proposed that those high in attachment anxiety may be more inclined to suppress the expression of anger, in order to avoid its potentially alienating results. In order to investigate this, Brenning and Braet conducted two studies with young adolescents (aged 11-18) to test this hypothesis, and found some support for this proposal. In study 1 (n=197) participants completed self-

report measures of attachment (ECR-R; Fraley et al., 2000b), and dispositional emotion regulation strategies (ER Inventory; Roth et al., 2009), with the items in the latter questionnaire adapted to specifically reflect the regulation of anger and sadness. In this study, structural equation modelling revealed that attachment avoidance was associated with anger dysregulation (i.e. leaving anger unregulated such that it is expressed outwardly in an extreme way) and sadness suppression (i.e. keeping sadness inside so that it is not externally expressed); however, attachment anxiety was associated with the dysregulation of both anger and sadness. Study 2 attempted to replicate this study, with the further consideration of an additional outcome measure: externalising symptoms (the Youth Self-Report; Achenback & Rescorla, 2001). The findings of this study were consistent with study 1, and further suggested that attachment anxiety was indirectly associated with depressive symptoms via the dysregulation of sadness, and indirectly related to aggression through the dysregulation of anger. Further, attachment avoidance was only found to be indirectly related to aggressive behaviour via anger dysregulation.

This suggests that while the approach taken to anger regulation may differ from other emotional contexts for those high in attachment avoidance, those high in attachment anxiety appear to apply the same under-regulating strategy regardless of emotion type. In other words, attachment avoidance may be associated with a contrasting regulatory approach in the context of anger (i.e. under-regulation rather than suppression), while the relationship between attachment anxiety and under-regulation appears to remain the same. This

suggests that attachment-related differences in emotion regulation may differ in the context of this particular emotion, but nonetheless still leads to negative outcomes for the individual. However, as Brenning and Braet (2013) conducted their study with early adolescents (age 11-16), it is possible that the suppression technique may not yet be fully engrained at this stage in development, as it is thought that this technique becomes more habitual over time as its usefulness for goal achievement is established (Shaver & Mikulincer, 2002). Furthermore, it is possible that, in early adolescence, the consequences of under-regulated anger are less severe than in adulthood, where there is a more salient risk of expressed anger interfering with social functioning. Thus, the notion of an anger-specific model of attachment-related emotion regulation requires further clarification.

Indeed, in contrast to Brenning and Braet (2013), a small number of empirical studies looking at the relationship between attachment insecurity and responsivity to anger inductions suggest that the suppression technique used by those high in attachment avoidance to regulate other negative emotions may also be used to regulate anger. Diamond and Hicks (2005) conducted a study with 75 young male participants in which anger was induced through two methods: 1) Experimenter harassment and discouraging feedback during a difficult serial subtraction task, and 2) Anger-recall, in which participants were asked to describe a recent event that made them extremely angry for two minutes. Participants completed state anxiety measures before and after each method of anger induction, as a measure of self-reported distress. Anger reactivity was scored by

subtracting baseline vagal tone from task vagal tone immediately after each induction, and anger recovery was similarly scored by subtracting baseline vagal tone from post-task vagal tone (5 minutes after induction). Vagal tone reflects general parasympathetic nervous system functioning, where higher resting vagal tone is associated with adaptive cognition and emotional processing, and low resting vagal tone is associated with hyperactivation and maladaptive emotional processing (Gross, 1998; Gross & Thompson, 2007).

In this study, attachment anxiety was positively associated with self-reported distress and negatively related to resting vagal tone. Attachment avoidance, on the other hand, was negatively related to distress recovery following anger induction and vagal tone at trend level. This indicates that attachment anxiety and, to some extent, attachment avoidance are related to persistently lower vagal tone than attachment security, which has previously been linked to maladaptive anger inhibition (Brosschot & Thayer, 1998). Attachment avoidance was also the only dimension that was negatively related to anger reactivity (i.e. vagal tone variability), which may indicate that those high in attachment avoidance are less likely to react physiologically to anger induction than those who are secure or anxious. These response patterns may be seen to reflect the under-regulating and suppressing strategies implemented by those high in attachment anxiety and attachment avoidance, and suggest that attachment avoidance may also be related to reduced physiological reactivity, raising the question of whether their suppression technique may be more successful at regulating both emotional

experience and expression in the context of anger. However, it should be noted that the effect sizes demonstrated in this study were all relatively small, potentially due to the small sample size used, and only male participants were used, hindering the generalisability of these findings.

Diamond and colleagues examined this further in a sample of 74 heterosexual relationship couples (total $n=148$), found that, in contrast to secure and anxious attachment, avoidance was the only attachment style found to be positively related to significant changes in skin conductance level reactivity during an anger-recall task, in which participants were instructed to explain a recent incident that made them feel angry, stressed or frustrated and provide clear detail about how they felt at that time, but not to elevated self-reports of distress during anger-recall (Diamond et al., 2006). This study once again supports the premise that those high in attachment avoidance may use suppression to regulate negative emotions, including anger, but it may only be successful in regulating expression and not the full emotional experience. These studies suggest that the pattern of low reported arousal and high physiological reactivity found in those high in attachment avoidance when negative emotions are induced may also extend to anger. This lack of coherence between the experience and physiological expression of anger and other emotions in those high in attachment avoidance, thought to reflect expressive suppression, is well documented (Mikulincer & Shaver, 2007), and further supported by these studies.

The research above highlights the potential importance of attachment theory in understanding the experience and expression of anger, suggesting that attachment anxiety may be a risk factor for elevated levels of dispositional anger, while attachment avoidance may be associated with increased hostility, and both dimensions may play a role in aggressive behaviour. However, the relationship between attachment and aggression in the normal population requires further attention as while attachment insecurity have been associated with aggressive behaviour in both terms of domestic violence (Bartholomew & Allison, 2006; Mikulincer, 2007), antisocial behaviour, and juvenile delinquency, the findings are often inconsistent and few empirical studies consider this association in the general population. Therefore, this will be addressed in this current thesis in order to provide further insight into attachment insecurity as a risk factors for aggressive behaviour.

The research presented in this chapter also presents an incoherent picture of the relationship between attachment insecurity and anger regulation, with some studies suggesting that the regulation patterns of those high in attachment insecurity match other emotional contexts, whilst there is a strong theoretical argument that alternative regulatory approaches may be more goal-congruent in the case of anger. Therefore, this study aims to provide some semblance of clarity on this issue through the exploration of attachment-related differences in anger regulation, specifically. By gaining a deeper understanding of how adult attachment is related to the regulation of anger experience and expression, it may be possible

to further understand whether, and under what circumstances, the under-regulation and suppression of anger may lead to aggressive behaviour in the context of insecure attachment. As outlined earlier, attachment theory posits that the dimensions of attachment anxiety and attachment avoidance can predict differences in emotion regulation (Schoe & Schoe, 2008), and thus may provide a useful foundation from which to develop an understanding of these anger regulation processes.

2.4. The relevance of self-esteem

“It is an absolute human certainty that no one can know his own beauty or perceive a sense of his own worth until it has been reflected back to him in the mirror of another loving, caring human being.” John Joseph Powell.

Theoretically, self-esteem is rooted in the interaction between the self and the social environment, where an individual's level of self-esteem is largely determined by their perceived success in social relationships (Leary, Tambor, Terdal & Downs, 1995). This has clear overlaps with attachment theory, which suggests that an individual's internal working models of self and other are constructed within the context of close relationships (Collins, Ford, Guichard & Allard, 2006). A secure attachment relationship is postulated to provide an individual with a positive internal working model of the self and a sense of self-worth that translates into higher levels of self-esteem (Bowlby, 1988). In line with this theoretical assumption, attachment anxiety has been empirically linked with low self-esteem consistently in the literature (Brennan & Bosson, 1998; Bylsma et al., 1997; Foster et al., 2007; Man & Hamid, 1998; Mikulincer & Shaver, 2005; Park et al., 2004), supposedly as a result of the negative self-model associated with attachment anxiety (Brennan and Bosson, 1998).

However, where attachment-avoidance is concerned, the relationship is less clear. As an extensive body of literature also implicates low self-esteem in increased levels of dispositional anger and hostility (D'Zurilla, Chang & Sanna, 2003) and aggressive behaviour (Donnellan et al., 2005; Fergusson & Horwood, 2002; Sprott & Doob, 2000), self-esteem may play an important role in the relationship between

attachment insecurity and the experience and expression of anger. Therefore, the aim of this chapter is to introduce two bodies of literature; one looking at attachment and self-esteem, and the other considering self-esteem as a risk factor for increased anger and aggression.

Self Esteem and Adult Attachment

Historically, the development and preservation of a positive self-image has been considered a fundamental lifespan goal, and intimate relationships are integral to how one's self-esteem and model of the self develops (Cooley, 1902; Rogers, 1959). Our perspective of our own self-worth also informs the nature of our model of others, and thus our perceptions, expectations and reactivity to the behaviour of those around us (Cozzarelli, Hoekstra, & Bylsma, 2000; Feeney & Noller, 1990). As attachment reflects internal cognitive models of the self, and of others (Bowlby, 1973), it is plausible that attachment relationships may have an impact on the development of a positive or negative global self-view (Bartholomew & Horowitz, 1991; Luke, Maio & Carnelley, 2004; Mikulincer, 1998). Thus, early interactions with a significant attachment figure are the first encounters through which one can begin to develop a model of self-worth and self-efficacy. As one transitions from infancy into adolescence and adulthood, alternative significant others, such as peers and romantic partners, become important in the amendment or maintenance of our sense of self-worth (Allen, 2008; Pascuzzo et al., 2013). A strong sense of self-worth is essential for the maintenance of self-esteem stability and emotional equilibrium,

which are required to effectively overcome negative life events (Kidd & Shahar, 2008). A positive sense of self-worth also facilitates adaptability and confidence in one's own ability to effectively regulate negative emotional states when attachment figures may be unavailable (Zimmermann, 1999).

The literature highlights two main sources of self-worth which contribute to an individual's level of self-esteem: social acceptance and successful action (Brennan & Bosson, 1998; Ludmer, Vernon & Gardner, 2013; Tatarodi & Swann, 1995). Social acceptance refers to a reliance on social and interpersonal sources of self-esteem. In other words, those who rely on social acceptance are mainly concerned with the approval of others. On the other hand, those who rely on successful action to inform their self-esteem are more concerned with being competent and successful in relevant domains. Ludmer, Vernon and Gardner (2013) suggest that the development and outcome of these domain-specific dependencies can be better understood in the context of attachment theory.

Mikulincer and Shaver (2005) support the suggestion that secure attachment is fundamental to stable, positive self-esteem, and research adds further strength to this argument, demonstrating significantly higher levels of self-esteem in those who are considered to be securely attached, compared with those who are anxiously attached (Bylsma et al., 1997; Man & Hamid, 1998). For example, Bylsma and colleagues (1997) investigated this notion in a sample of 571 undergraduate students in America, measuring global self-esteem, self-attributes (which required

participants to rate their own competence in specific domains as compared to the 'average' college student), and romantic adult attachment. A series of ANOVAs revealed that dismissive-avoidant and secure individuals reported significantly higher global self-esteem than preoccupied or fearful-avoidant individuals. However, differences in competence ratings between attachment styles was only identified for socially relevant domains (i.e. social, romantic and physical attractiveness), with dismissive-avoidant and secure individuals once again reporting significantly higher competence than those who were preoccupied or fearful-avoidant, suggesting that those who are high exclusively in attachment avoidance (in the absence of high attachment anxiety) have relatively intact self-esteem and social self-competency beliefs. Laible, Carlo and Roesch (2004) looked at the relationship between self-esteem and attachment security in adolescents, taking into account both peer and parent attachment. Through the use of self-report measures, their research revealed a significant positive correlation between self-esteem and both parent and peer attachment, suggesting that those who are more securely attached have higher self-esteem. However, the attachment measure used in this study (Inventory of Parent and Peer Attachment; Armsden & Greenberg, 1987) provides scores on a scale from 'insecure' to 'secure', and so does not provide any indication of difference between those who are specifically high in attachment anxiety or attachment avoidance. Nevertheless, other studies that have considered the relationship between adult attachment and self-esteem have highlighted a significant negative association between global self-esteem and both attachment anxiety and attachment avoidance (e.g. Cozzarelli, Sumer & Bylsma, 1997; Doinita, 2015).

However, as mentioned previously, a growing body of research suggests that variations in attachment insecurity are differentially associated with self-esteem, such that those high in attachment avoidance tend to have higher self-esteem, whilst those high in attachment anxiety have lower and more unstable self-esteem (Brennan & Bosson, 1998; Foster et al., 2007; Park et al., 2004). Following on from Bylsma and colleagues (1997) study outlined earlier, further research supports the idea that secure and dismissive-avoidant attachment styles have higher self-esteem (Huntsinger and Luecken, 2004) and that dismissive attachment is related to higher self-esteem than fearful-avoidant attachment (Shaver et al., 1996). This seems to suggest that high attachment avoidance is only linked with higher self-esteem when it is not paired with high attachment anxiety. This may explain the inconsistency present in the literature when attachment is measured using dimensional instruments (e.g. the ECR-R) versus categorical measures (e.g. the RQ).

However, the sources upon which these two groups rely to inform their self-esteem also differs. Those high in attachment avoidance have been found to rely more heavily on agentic sources of esteem such as competence, academic abilities and self-reliance (i.e. successful action; Brennan & Bosson, 1998; Park et al., 2004). On the other hand, anxious attachment has been linked to a reliance on more interpersonal sources of self-worth such as approval and affection from others (i.e. social acceptance; Knee et al., 2008; Park et al., 2004). Brennan and Morris (1997) applied a measure of self-liking and perceived self-competence (The Self-Liking/Self

Competence Scale; Tatarodi & Swann, 1995) alongside the ECR-R, which they categorised, to investigate sources of self-esteem in secure and dismissing-avoidant individuals. Self-competence reflects an individual's perception of their own capabilities based on their previous experiences of goal achievement; while self-liking is based on one's own sense of self-worth, based on internalised values regarding social expectations (e.g. attractiveness, kindness; Tatarodi & Swann, 2001). In other words, self-competence is formed based on concrete evidence of abilities (i.e. self-efficacy), while self-liking is developed based on the extent to which an individual feels they are viewed positively by others.

Measuring self-esteem based on these two underlying measures has demonstrated high validity in previous studies (e.g. Tatarodi, Marshall & Milne, 2003; Tatarodi & Swann, 1995). Brennan and Morris (1997) found that dismissing-avoidance was associated more strongly with self-competence, whereas secure attachment was associated with both self-liking and self-competence. However, much of the research looking at the relationship between attachment and self-esteem appears to focus on a categorical approach, which researchers suggest may not be the most accurate way to measure attachment.

Crocker and colleagues suggested that, when feedback from others is deemed important and relevant by the individual, attachment insecurity is significantly associated with self-esteem fluctuations in response to specific types of negative feedback (Crocker et al., 2002). In order to test this theory, Hepper and

Carnelley (2011) used a dimensional measure of attachment to investigate the relationship between insecure attachment and the impact of different types of feedback on daily self-esteem fluctuations; specifically, interpersonal (reflecting acceptance, personal attractiveness and conflict) and agentic (reflecting personal or academic success) sources of feedback. Their diary study found that attachment anxiety was associated with higher levels of fluctuation in response to rejection-related interpersonal feedback and idiosyncratic negative interpersonal feedback. However, attachment avoidance was significantly related to reduced responses to positive interpersonal feedback, but higher fluctuations as a result of positive agentic feedback and negative rejection-related interpersonal feedback. In order to identify differences between those whose individual scores would be considered to reflect fearful or dismissing attachment patterns, Hepper and Carnelley also examined the interaction between attachment anxiety and attachment avoidance, and found that those high in both attachment anxiety and attachment avoidance (reflecting fearful-avoidant attachment) showed higher fluctuations in response to positive agentic feedback, while those high in attachment avoidance but low in attachment anxiety (reflecting dismissing-avoidant attachment) reported relatively low levels of fluctuation. However, there were no significant findings for a relationship between insecure attachment and impact of negative agentic feedback. This suggests that those high in attachment anxiety may suffer fluctuations in self-esteem as a result of negative interpersonal feedback, seen to reflect the way in which they are viewed by others (i.e. self-liking), whereas those high in attachment avoidance are more likely to face fluctuations in light of positive agentic feedback,

which reflects positive performance-related feedback (i.e. self-competence). However, rejection-related interpersonal feedback appears to result in self-esteem instability for both insecure attachment dimensions.

A similar finding was revealed by research looking at the relationship between attachment and reactions to partner feedback specifically in 371 young adult participants. Participants responded to self-report measures of adult attachment, self-esteem (both global and source-specific) and reactions to partner feedback with either their current or most recent partner in mind. Findings suggested that those with a negative model of others (i.e. those high in attachment avoidance) had a tendency to respond in a hostile or resistant way to partner feedback, while those with a negative self-model (i.e. those high in attachment anxiety) were more prone to finding it highly distressing (Brennan and Bosson, 1998). Due to the interpersonal nature of partner feedback, these findings suggest that both those high in attachment anxiety and attachment avoidance are reactive to interpersonal feedback, but the nature of their responding may differ based on the sources upon which they rely upon to inform their levels of self-esteem. However, as this study used prospective partner feedback (in some cases in those who were not currently in a romantic relationship; although the researchers did rerun the analysis excluding single participants and results remained the same), it cannot clarify the extent to which these response patterns are reflective of how these individuals might respond to real-time partner feedback, which may produce more salient emotional and behavioural reactions.

Taken together, these findings provide support for attachment-related differences in the sources of self-esteem. This over-reliance on external (others; social acceptance; self-liking) or internal (the self; successful action; self-competence) sources to build self-esteem, as opposed to a combination of the two, has been highlighted by various researchers as playing a key role in the link between insecure attachment and poor well-being (Campbell et al., 2005; Feeney, 1999; Hazan & Shaver, 1990; Wei et al., 2005). Further, it seems that, while some research indicates an association between both insecure attachment dimensions and low self-esteem (Cozzarelli et al., 1997; Doinita, 2015), that majority of literature points towards attachment anxiety as an independent risk factor for low self-esteem (Brennan & Bosson, 1998; Bylsma et al., 1997; Foster et al., 2007; Man & Hamid, 1998; Mikulincer & Shaver, 2005; Park et al., 2004) suggesting that attachment avoidance may only be implicated in low self-esteem due to its interaction with attachment anxiety.

Self Esteem, Anger and Aggression

While there is extensive evidence to suggest that there are attachment-related differences in self-esteem, it has long been argued that low self-esteem is a risk factor for a variety of externalising issues such as criminal activity and aggressive behaviour (Donnellan et al., 2005; Fergusson & Horwood, 2002; Sprott & Doob, 2000). D’Zurilla and colleagues (2003) found that low global self-esteem was related

to higher levels of trait anger and hostile aggression, as measured by the Aggression Questionnaire (Buss & Warren, 2000), in a sample of 205 undergraduate college students. This relationship between low self-esteem and high hostile aggression was also found in a larger study by Buss and Perry (1991), in which there was no link between self-esteem and verbal or physical aggression. This suggests that low self-esteem may specifically predict hostile cognitions associated with aggression, as opposed to externalised aggressive behaviour.

Walker and Bright (2009) reviewed research on self-esteem and violent behaviour, spanning two decades from 1986 to 2006, and found that the majority of literature revealed a negative relationship between self-esteem and violent behaviour, even when controlling for gender, depressive symptoms, narcissism and socioeconomic status (Trzesniewski et al., 2006; Webster, 2006). Low self-esteem has also been linked to domestic violence (Papadakaki et al., 2009) and violent criminal activity (Trzesniewski et al., 2006). This suggests that low self-esteem is specifically related to higher levels of dispositional anger and hostility and, in some instances, aggressive behaviour (although this was not found when physical aggression was measured using Buss and Perry's aggression questionnaire; Buss & Warren, 2000).

While much research on self-esteem and aggression has previously focused on the role of low self-esteem in violent or aggressive behaviour, more recent research is providing increasing support for high self-esteem as a risk factor for

aggressive behaviour (Blaine & Crocker, 1993). Baumeister and colleagues suggest that research linking low self-esteem to aggression suffers from a high level of contradictory evidence and that aggressive behaviour more often occurs as a result of a discrepancy between a positive self-appraisal and a negative external-appraisal (Baumeister, Smart & Boden, 1996). They suggest that high self-esteem can be a major contributing factor to aggressive behaviour in situations where that high self-esteem is threatened, and the individuals high self-view is questioned, contradicted or challenged (i.e. 'threatened egotism'). In other words, when an individual receives negative feedback that is incongruent with their self-view, they may be more likely to aggress against the source of the feedback. Baumeister and colleagues suggest that this is most commonly the outcome in people who are unwilling to adjust their high self-view accordingly. This may highlight a difference in threat response between secure individuals, and those who score highly on attachment avoidance, as attachment avoidance is associated with a need to maintain a highly positive sense of self in order to avoid reliance on external support. Secure individuals, on the other hand, do not rely so heavily on the self (Griffin & Bartholomew, 1994).

However, in attempts to clarify this relationship, research appears to suggest that high self-esteem alone may not be a risk factor for increased aggression (Bushman et al., 2009; Papps & O'Carroll, 1998; Thomaes et al., 2008). Rather, when high self-esteem is over-inflated and unstable, an ego-threat may jeopardise the individuals' high self-esteem and ultimately lead to a hostile and aggressive

response (Webster et al., 2007). So while there is a clear theoretical argument for the link between high self-esteem and increased aggression, there is currently a lack of empirical support for this hypothesis, suggesting that this relationship may only exist in the presence of other mediating factors (e.g. high narcissism), when high levels of self-esteem are unstable.

Collectively, this suggests that attachment anxiety and attachment avoidance may be associated with self-esteem, but the former is more likely to be related to self-liking, whilst the latter may be more closely associated with differences in self-competence. Both low self-esteem and that which is high, but unstable, have also been demonstrated to be risk factors for increased dispositional anger, hostility and, in some cases, aggression. Thus, the combination of insecure attachment and low levels of self-esteem may put individuals at an increased risk of the dysfunctional expression of anger.

2.5. The present thesis

Attachment theory is becoming of increasing importance in the study of interpersonal behaviour and individual differences in emotion regulatory processes in adulthood (Mikulincer, Dolev & Shaver, 2004; Mikulincer & Shaver, 2003); however, there is a distinct lack of research considering attachment-related differences in the regulation of anger and subsequent aggressive behaviour. The research presented in the preceding chapters provides evidence to suggest that attachment anxiety may be a risk factor for elevated levels of dispositional anger (e.g. Kidd & Sheffield, 2005; Troisi & D'Argenio, 2004), while both attachment anxiety and attachment avoidance may be associated with increased hostility (e.g. Mikulincer, 1998) and aggressive behaviour in specific contexts (e.g. domestic violence; Bartholomew & Allison, 2006; Mikulincer, 2007), suggesting key attachment-related differences in the expression of anger. However, the relationship between attachment and aggression in the normal population requires further attention in order to clarify the inconsistency that exist within the literature. Therefore, this thesis will explore attachment-related differences in dispositional anger and aggressive behaviour with the hopes of clarifying the attachment-aggression link.

Furthermore, there is still a distinct lack of research considering the underlying mechanisms that facilitate the relationship between attachment and aggression. While evidence for consistent attachment-related differences in emotion

regulatory processes has been identified, there is still a high level of incoherence in the sparse literature surrounding the relationship between attachment insecurity and anger regulation specifically, with some studies suggesting that their regulation patterns remain the same as in other emotional contexts (i.e. suppression for attachment avoidance and under-regulation for attachment anxiety; e.g. Diamond & Hicks, 2005; Diamond et al., 2006), whilst there is a strong theoretical argument that alternative regulatory approaches may be more goal-congruent in the case of anger (Braet & Branning, 2013). Therefore, this thesis aims to provide some semblance of clarity on this issue through the exploration of attachment-related differences in anger regulation, specifically, and to identify whether the use of specific anger regulation strategies may in some way facilitate the relationship between attachment insecurity and aspects of aggression with the aim of developing a clearer understanding of whether, and under what circumstances, the under-regulation and suppression of anger may lead to aggressive behaviour in the context of insecure attachment.

Research supporting the relevance of self-esteem as a key component of insecure attachment, and a risk factor for the dysfunctional expression of anger, highlights the importance of taking this construct into account when researching this relationship. Furthermore, as the second study of this thesis involves a negative feedback-based anger induction procedure, self-esteem may play a key role in how those high in attachment anxiety and attachment avoidance respond to such a provocation (this is discussed in more depth within chapter 5, in which Study 2 is

disseminated). Thus, the present thesis was designed with the aim of investigating the relationship between adult attachment, dispositional anger and aggression, taking into account the role of attachment-related differences in anger regulation (namely, anger suppression, under-regulation and anger control) and self-esteem (self-liking and self-competence).

In order to achieve these aims, as outlined in the introduction chapter of this thesis, Study 1a implemented a questionnaire-based cross-sectional study to identify the extent to which variation in adult attachment dimensions and self-esteem facets could predict variation in dispositional anger. Following that, Study 1b investigated whether the use of the specific anger regulation strategies mentioned above played a mediating role in the relationship between attachment insecurity and three facets of dispositional aggression (physical aggression, verbal aggression and hostility). Finally, Study 2 looked at the relationship between attachment insecurity, self-esteem, physiological and self-reported responses to an anger induction procedure and subsequent aggressive behaviour. It is hoped that the findings from this thesis will contribute to the understanding of adult attachment as a theoretical framework for understanding aggressive behaviour in the normal population, and offer recommendations for targetable factors in anger management interventions in a variety of settings from workplace conflict mediation to offender rehabilitation.

Chapter 3. Study 1a: Adult attachment, self-esteem and dispositional anger

3.1 Introduction Study 1a

The aim of Study 1a was to examine the extent to which variation in adult attachment dimensions could predict variation in dispositional anger. Bowlby's conceptualisation of attachment proposed that attachment insecurity and elevated anger go hand in hand (Bowlby, 1988), but it is possible that attachment anxiety and attachment avoidance are related differentially to this dispositional construct. The research presented in the literature review chapter of this thesis reveals that a number of studies suggest an association between elevated trait anger and both attachment anxiety and attachment avoidance (Meesters & Muris, 2002; Muris et al., 2004). However, upon further investigation, it appears that the attachment anxiety dimension may be an especially salient risk factor for increased dispositional anger, over and above attachment avoidance, indicating that attachment avoidance is only related to increased dispositional anger when levels of attachment anxiety are also high (Troisi & D'Argenio, 2004).

This has been clarified by a number of studies indicating that attachment anxiety specifically, or attachment categories characterised by a combination of both high anxiety and high avoidance (i.e. fearful-avoidant attachment) is associated with

increased trait anger (Kidd & Sheffield, 2005; Mikulincer, 1998), and a tendency to respond more frequently with anger in daily interactions (Dutton et al., 1994) in both general and clinical populations (Critchfield et al., 2008). These findings seem to suggest that attachment anxiety may be the strongest risk factor for high levels of trait anger, and that this risk increases when coupled with equally high levels of attachment avoidance. This brings into questions whether or not attachment avoidance is related to trait anger independently.

Taken together, this research suggests that attachment anxiety is likely to be associated with elevated levels of trait anger; Further, it suggests that high levels of both attachment anxiety and attachment avoidance (reflected by an interaction between the two dimensions) are likely to significantly predict trait anger. However, it is expected that attachment avoidance will not predict trait anger when attachment anxiety is controlled for. The self-esteem literature also indicates a consistent relationship between self-esteem and both dispositional anger and insecure attachment. In order to investigate these propositions, a questionnaire-based cross-sectional study was designed in order to test three specific hypotheses:

Hypothesis 1.1: Attachment anxiety will be a significant predictor of trait anger scores, such that increased attachment anxiety will predict increased trait anger

Hypothesis 1.2: Self-esteem variables will predict additional variance in trait anger scores

Hypothesis 1.3: The interaction between attachment anxiety and attachment

avoidance will make a unique contribution to trait anger scores

The terms ‘predictor’ and ‘risk factor’ are often used interchangeably in the literature, so it is important to clarify their meaning within this thesis. Up to this point, the term risk factor has been used to illustrate theoretically causal relationships (e.g. attachment insecurity is proposed to lead to poor emotion regulation; Shaver & Mikulincer, 2002). The term predictor, on the other hand, does not necessitate a causal direction (Allison, 1998). Rather, it indicates that two things are statistically associated, and that variance in one is linked to variance in a specific direction in the other, but does not specify whether or not the relationship between these things is directional or bidirectional. The use of the term predictor is therefore most suitable when making hypotheses about correlational analysis such as that carried out throughout this thesis. With this in mind, the term predictor will be used from here on out.

3.2 Method Study 1a

3.2.1 Participants

Following ethical approval from Queen Margaret University’s ethics panel (see Appendix 1a), participants were recruited internally through a research recruitment email distributed throughout the university, and the Research Participation Scheme in which second year undergraduate Psychology students are required to take part in internal research projects to achieve course credit. The only inclusion criterion

was that participants were required to be over the age of 18 to take part. An a-priori power analysis, conducted using G* Power 3.1, suggested that a sample of at least 85 participants was required to achieve 80% power in detecting a medium effect size in the forthcoming regression analysis (based on an alpha of .05). A medium effect size was expected given the literature showing a range of small to medium effects in the relationship between attachment and emotion/emotion regulation related variables across a range of domains (e.g. Cooper & Shaver, 1998; David, Shaver & Vernon, 2003; Kafetsios, 2004; Meredith, Strong & Feeney, 2006; Trub & Starks, 2017). This power analysis was based on four predictors (attachment anxiety, attachment avoidance, self-liking and self-competence). The final sample consisted of 270 individuals (80.7% female and 19.3% male). Fifty-six and a half percent of the respondents were currently registered students, with an average age of 29.2 years old (SD = 9.78); their age ranged from 18-63 years. Participants were also asked whether English was their first language; 86.7% identified that it was, while 12.3% said that it was not.

3.2.2 Procedure

Participants completed the psychometric questionnaires listed below online via the Bristol Online Survey website (www.onlinesurveys.ac.uk). Upon opening the survey site, participants were presented with an information sheet (see Appendix 2a), outlining what would be required of them should they choose to continue. They

were then presented with a consent form (see Appendix 3) and asked to click 'continue' to indicate that they had decided to participate in the study voluntarily, and had understood all of the information provided. Following completion of the questionnaire set, a debriefing page (see Appendix 4a) was displayed with further information on the study and contact details for the researchers should the participant have any further questions following participation. A link to a support website for dealing with anger was also provided (www.mind.org.uk/information-support/types-of-mental-health-problems/anger).

3.2.3 Measures

Data for study 1a and 1b was collected together as part of a larger study consisting of a number of psychometric questionnaires. The following questionnaires were utilised for Study 1a.

(i) Adult Attachment: Experiences in Close Relationships Revised scale (ECR-R; Fraley et al., 2000b)

The ECR-R is a 36-item self-report measure of adult attachment. This tool advanced from the original Experiences in Close Relationships Inventory, which was developed by Brennan and colleagues following a factor-analysis of all current self-report attachment measures, which revealed that they were commonly underpinned by the same two central dimensions: attachment anxiety (e.g. I often worry that my

partner will not want to stay with me) and attachment avoidance (e.g. I prefer not to be too close to romantic partners) (Brennan et al., 1998). The ECR-R measures these two subscales, with participants responding to items assessing how they 'generally' behave in romantic relationships, regardless of their current relationship status, on a 7-point Likert-scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores on the two subscales within this measure reflect higher levels of attachment anxiety (items 1-18) and attachment avoidance (items 19-36), while lower scores reflect secure attachment. A survey of over 17,000 participants revealed that the population norm for attachment anxiety is 3.56 and for attachment avoidance is 2.92 (Fraley, 2012). In the present study, the internal consistency of this scale was $\alpha = .94$ for the attachment anxiety subscale, and $\alpha = .95$ for the attachment avoidance subscale, compared with $\alpha = .89$ and $\alpha = .90$, respectively, in previous research (Ein-Dor, Mikulincer & Shaver, 2011).

(ii) Trait anger: State-Trait Anger Expression Inventory-2 (STAXI-2; Spielberger et al., 1999)

The STAXI-2 is a self-report measure used to assess levels of state anger, trait anger and tendency to use specific anger regulation processes. However, as the present study was focused on dispositional anger and not the intensity of anger felt specifically at the time of participation, or the regulation processes implemented, only the trait anger subscale was used in this study. This is a 10 item subscale, in which higher scores reflect a high regularity of angry feelings in everyday life (e.g. I am a hot-headed person, I am quick tempered). Participants responded to the above

items on a 4-point Likert-scale ranging from 1 (almost never) to 4 (almost always). Population norms for this scale are proposed to fall around 17.2 (Culhane & Morera, 2010). In a sample of 246 undergraduate students, Culhane and Morera (2010) demonstrated an alpha coefficient of $\alpha = .83$ for trait anger, while in the present study the internal consistency of the trait anger subscale was $\alpha = .86$, suggesting good internal consistency. Licencing permission for using the STAXI-2 was received from Psychological Assessment Resources Inc. and a copyright message was displayed on the survey window, as requested by PAR Inc. (PAR Inc; see Appendix 5).

(iii) Self-Esteem: The Self-Liking/Self-Competence Scale Revised (SLSC-R; Tafarodi & Swann, 1995)

Self-esteem was measured using the SLSC-R. This scale measures self-esteem on two 8-item subscales: self-competence (e.g. I am highly effective at things I do) and self-liking (e.g. I feel great about who I am). Participants respond to items on a 5-point Likert-scale: 1 (strongly disagree) to 5 (strongly agree). Average scores on the self-liking subscale are indicated to be around 37.19 (for females) and 38.36 (for males), while the self-competence subscale means have been reported as 41.86 (for females) and 42.54 (for males) (Tafarodi & Swann, 1995). The reliability and validity of this measure has been supported in previous research (Aidman, 1998; Tafarodi et al., 2003; Tafarodi & Milne, 2002), with Tarafodi and Swann reporting high internal consistencies of $\alpha = .92$ for the self-liking subscales and $\alpha = .89$ for self-competence (Tarafodi & Swann, 1995). Cronbach's alpha coefficients for the SLSC-R in the present

study were $\alpha = .92$ for self-liking and $\alpha = .81$ for self-competence, suggesting similarly strong internal consistency.

3.2.4 Analytical strategy

The data for this study were analysed using SPSS 21. Firstly, data screening took place, to identify any outliers and determine the distribution of the data (outlined below). Then descriptive statistics and correlations were conducted to investigate the univariate relationships between attachment dimensions, self-esteem subscales and trait anger. Secondly, partial correlations were conducted to identify the relationship between each attachment dimension (independently of the other) and remaining main study variables. To address hypotheses 1.1 (that attachment anxiety would predict variance in trait anger scores) and 1.2 (that self-esteem variable would add significantly to a predictive model of trait anger), multiple regression analyses were performed to investigate attachment and self-esteem dimensions as predictors of trait anger. Finally, a moderation analysis was conducted to identify whether the interaction between attachment anxiety and attachment avoidance was a unique predictor of trait anger scores (hypothesis 1.3).

3.3 Results Study 1a

3.3.1 Data screening

Z-scores were calculated for all variables measured using SPSS and scores in excess of ± 3.29 were considered to be outliers, as outlined by Tabachnick and Fidell (2007). No outliers were identified thus the final sample remained at $n=270$. Skewness statistics were used to determine whether data for each variable were normally distributed. Variable scores are considered to be normally distributed if the skewness statistic falls within the range of \pm twice the Std. Error of Skewness. As the Std. Error of Skewness for this data was reported in the descriptive analyses as .149, the normal range was $-.298$ to $+.298$. In line with this range, all variable except self-liking and self-competence were non normal, demonstrating slight positive skews (see Table 1). However, as the sample size was relatively large, this was not thought to be an issue for conducting the impending multiple regression analyses as the residuals were normally distributed.

3.3.2 Descriptive statistics

Age and gender

Descriptive statistics and correlations for the main study variables are displayed in Table 1. Cohen's (1988) standards for Pearson's correlation coefficient effect size were used to determine the strength of the effects (i.e. small, $r = .1$; medium, $r = .3$; large, $r = .5$). Independent samples t-tests indicated that males were significantly

higher in self-reported self-competence than females ($t(266) = 2.295, p = .022$). Otherwise, there were no gender differences. Age was negatively correlated with trait anger ($r = -.14, p = .023$; small effect), and positively correlated with self-competence ($r = .20, p = .001$; small to medium effect), indicating that age is associated with decreasing levels of trait anger, and increasing levels of self-competence.

Measure inter-correlations, internal consistency and norms

The attachment anxiety and attachment avoidance subscales of the ECR-R were positively correlated with one another ($r = .46, p < .001$; medium to large effect). This reflects the expected relationship between these two dimensions, based on a previous normal population sample ($r = .41$; Fraley, 2010). As can be seen in table 1 the ECR-R had means of 3.00 ($SD = 1.23$; attachment anxiety) and 2.96 ($SD = 1.21$; attachment avoidance). Both of these means are relatively in line with what is expected in a normal population sample ($m = 2.92, SD = 1.19$ and $m = 3.56, SD = 1.12$, respectively; Fraley, 2012). The self-liking and self-competence subscales of the SLSC-R were also positively correlated with one another ($r = .63, p < .00$; large effect¹). Again, this was in line with the anticipated correlation between these two dimensions based on previous validations of the instrument ($r = .69$; Tafariodi & Swann, 1995). Average participant scores on both self-liking ($m = 23.90, SD = 7.86$) and self-competence ($m = 25.24, SD = 5.33$) were lower than expected, with Tafariodi & Swann (1995) indicating average self-liking scores of 37.19 ($SD = 8.35$) for females

and 38.36 (SD= 7.90) for males; and self-competence averages of 41.86 (SD= 6.58) for females, and 42.54 (SD= 6.35) for males. This suggests below average self-esteem scores in this sample. Average trait anger scores in this current sample ($m=19.49$, $SD= 5.32$) were marginally higher than that found by Spielberger ($m=17.89$, $SD=4.94$ for females and $m=18.40$, $SD=5.43$ for males; Spielberger, 1999). Overall this sample were average in their attachment scores, lower in their levels of self-esteem and slightly higher than average in trait anger. However, it should be noted that no statistical tests were carried out to determine whether or not these differences are significant, and so they can only be considered at trend level within this thesis.

3.3.3 Relationships between attachment, trait anger and self-esteem

Pearson's correlations were conducted to identify relationships between main study variables (see Table 1). This analysis demonstrated a significant association between attachment dimensions and trait anger. Trait anger was positively associated with attachment anxiety ($r = .25$, $p < .001$; small to medium effect) and with attachment avoidance ($r = .13$, $p = .033$; small effect). Significant negative associations were observed between self-liking and both attachment anxiety ($r = -.47$, $p < .001$; large effect) and attachment avoidance ($r = -.23$, $p < .001$; small to medium effect). Similarly, attachment anxiety and attachment avoidance were negatively associated with self-competence ($r = -.34$, $p < .001$ and $r = -.21$, $p = .001$, respectively);

demonstrating a medium effect for attachment anxiety and a small to medium effect for attachment avoidance. Trait anger also had a marginally significant negative relationship with self-liking ($r = -.12, p = .050$; small effect), but not with self-competence ($r = -.11, p = .062$).

Table 1. Descriptive statistics and Pearson's correlations among main variables (n = 270).

		Mean	SD	Skewness	Kurtosis	1	2	3	4	5	6
	1. Age	29.19	9.78	1.41	1.33	1	-.08	.05	.05	.20**	-.14
ECR-R	2. Anxiety	3.00	1.23	.369	-.404		1	.46**	-.47**	-.34**	.25**
	3. Avoidance	2.96	1.21	.503	-.515			1	-.23**	-.21**	.13*
SLSC-R	4. Self-Liking	23.90	7.86	-.021	-.826				1	.63**	-.12*
	5. Self-Competence	25.24	5.33	.031	-.171					1	-.11
STAXI-2	6. Trait Anger	19.49	5.32	.669	-.013						1

* $p < .05$, ** $p < .01$

3.3.4 Partial correlations between attachment, trait anger and self-esteem

To determine whether the relationship between one attachment dimension and the main study variables differed when controlling for the other, partial correlations were conducted (see Table 2). Partial correlations measure the strength of the relationship between two variables whilst controlling for the effect of a third

variable. When controlling for avoidance, anxiety was still significantly correlated with self-liking ($r = -.43, p < .001$; medium to large effect), self-competence ($r = -.28, p < .001$; small to medium effect) and trait anger ($r = .23, p < .001$; small to medium effect). However, when controlling for attachment anxiety, attachment avoidance no longer demonstrated significant association with either self-esteem variable ($r = -.01, p = .830$ and $r = -.06, p = .305$, respectively) or trait anger ($r = .00, p = .987$). This suggests that as attachment anxiety increases, self-liking and self-competence decrease, while trait anger increases. On the other hand, neither self-esteem nor trait anger have a significant relationship with attachment avoidance. This lends support for hypotheses 1.1 and 1.2, which predicted that attachment anxiety would be associated with trait anger, while attachment avoidance would not.

Table 2. Partial correlations between attachment dimensions, trait anger and self-esteem variables (controlling for each dimension)

	Self-liking	Self-competence	Trait anger
1. Anxiety (controlling for avoidance)	-.43**	-.28**	.23**
2. Avoidance (controlling for anxiety)	-.01	-.06	.00

** $p < .001$

3.3.5 Attachment dimensions and self-esteem variables as predictors of trait anger

Hypothesis 1.1 predicted that attachment anxiety would be a predictor of trait anger scores. Further, hypothesis 1.2 proposed that the combination of attachment anxiety and self-esteem variables (self-liking and self-competence) would predict a significantly increased amount of variance in trait anger scores. Attachment and self-esteem variables that were associated with trait anger at $p < .10$ at the univariate level were selected as candidates for the following multivariable models, as it is suggested that the significance value should be relaxed when selecting variables for multiple regression as traditional significance limits (e.g. $p < .05$) can often fail to demonstrate significance in variables known to be important predictors (Bursac, Gauss, Williams & Hosmer, 2008). As recommended by Cohen (1988) for regression analysis, an effect size of $R^2 = .02$ was considered to be a small effect, $R^2 = .15$ was considered a medium effect and $R^2 = .35$ was deemed to be a large effect.

Preliminary analyses were carried out to ensure that the data did not violate the assumptions of multicollinearity, independent errors, non-zero variances, normality, homoscedacity and linearity. Analysis of standard residuals did not identify any outliers (Std. Residual Min = -2.128, Std. Residual Max = 3.111). Tests also revealed no issues with multicollinearity, as variance inflation factor (VIF) values were all below 5 (as recommended by Heirberger & Holland, 2013) and Tolerance statistics all exceeded 0.1 (the minimum level recommended by Tabachnick & Fidell, 2001). The assumption of independent errors was also met (Durbin-Watson value

=2.008), as was that of non-zero variances. Both the histogram and the normal P-P plot of standardized residuals suggested normally distributed errors, and a scatterplot of standardised predicted values confirmed that the data were homoscedastic and linear.

Firstly, to test hypotheses 1.1 and 1.2, hierarchical multiple regression was carried out to determine whether attachment anxiety, attachment avoidance, self-liking and self-competence predicted trait anger scores, controlling for age and gender (see Table 3). At Step 1, age and gender accounted for a significant proportion of the variance ($R^2=.02$, $p=.045$; small effect). The addition of attachment anxiety to the regression equation resulted in a significant increase to R^2 ($R^2=.09$, $R^2_{\text{change}}=.06$, $p<.001$; small to medium effect). In the 3rd step, the addition of self-liking and self-competence to the model did not have a significant impact on R^2 ($R^2=.09$, $R^2_{\text{change}}=.00$, $p=.908$). In the final model, attachment anxiety ($\beta=.23$, $p=.002$) and age ($\beta=-.13$, $p=.036$) were significant predictors of trait anger scores, with medium to large effect sizes, but attachment avoidance ($\beta=.02$, $p=.828$), self-liking ($\beta=-.01$, $p=.883$), self-competence ($\beta=-.02$, $p=.799$) and gender ($\beta=-.02$, $p=.743$) were not. These findings suggest that as attachment anxiety increases, trait anger also increases; while trait anger decreases with age. This model lends support for hypothesis 1.1, as anxiety was a significant independent predictor of trait anger scores. However, hypothesis 1.2 must be rejected as the self-esteem variables did not demonstrate any additional predicted variance in trait anger scores and did not

present as significant predictors in the model.

Table 3. Hierarchical multiple regression analysis predicting trait anger scores with attachment anxiety, attachment avoidance self-liking and self-competence, controlling for age and gender (n= 270)

	R^2	ΔR^2	F_{change}	R^2_{change}	B	95% CI	
						LL	UL
<i>Step 1</i>	.02	.02	3.13	.02			
Age					-.15*	-.15	-.02
Gender					.00	-1.66	1.69
<i>Step 2</i>	.09	.07	9.05	.06			
Age					-.13*	-.14	-.01
Gender					-.02	-1.85	1.40
Attachment Anxiety					.24***	.50	1.67
Attachment Avoidance					.02	-.52	.67
<i>Step 3</i>	.09	.07	.10	.00			
Age					-.13*	-.14	-.01
Gender					-.02	-1.92	1.37
Attachment Anxiety					.23***	.39	1.68
Attachment Avoidance					.02	-.54	.67
Self-Liking					-.01	-.12	.10
Self-Competence					-.02	-.18	.14

* $p < .05$; ** $p < .01$; *** $p < .001$

3.3.6 The interaction between attachment anxiety and attachment avoidance as a unique predictor of trait anger scores

Finally, a moderation analysis was conducted, using Hayes' (2013) PROCESS add-on for SPSS, to identify whether the interaction between attachment anxiety and attachment avoidance was a unique predictor of trait anger scores, after controlling

for the main effects of age, gender, attachment anxiety and attachment avoidance (addressing hypothesis 1.3). While Baron and Kenny's (1986) procedural approach to mediation and moderation analysis has been commonly applied to identify mediating and moderating effects in the past, more recent literature argues that this method does not quantify the indirect effect efficiently, relying instead on null hypothesis testing to determine significant indirect effects (Field, 2013; Hayes, 2013; Zhao, Lynch, & Chen, 2010). In order to address this issue, Hayes (2013) developed the PROCESS macro for SPSS, which uses bootstrapped confidence intervals to statistically infer indirect effects, and this method is proposed to be the most statistically valid way to test for mediating and moderating effects (Field, 2013). Therefore, the PROCESS approach was applied throughout this thesis. Preacher and Kelley (2011) suggest the completely standardised indirect effect betas can be used in moderation analysis to indicate the effect size of each indirect effect. While some researchers use Cohen's (1988) standards for effect size (i.e. .1 = small, .3 = medium, .5 = large) (Shrout & Bolger, 2002), David Kenny (2016) suggests that these values be squared in the case of mediation, as the completely standardised indirect effect reflects two effects combined (i.e. the effect of X on M, and the effect of M on Y). Therefore, the standards for effect size used in this study were .01 for a small effect, .09 for a medium effect and .25 for a large effect.

However, in the present model, the interaction between attachment anxiety and attachment avoidance was not significant in predicting variance in trait anger scores ($\beta = -.10$, 95% CI $[-.36, .17]$, $t = -.72$, $p = .476$) suggesting that levels of

attachment avoidance did not have a bearing on the strength of the relationship between attachment anxiety and trait anger.

3.3.7 Summary of analyses

Multiple regression analyses revealed that attachment anxiety was a significant independent predictor of trait anger. Self-esteem variables did not explain further variance in trait anger. Specifically, analyses suggest that as attachment anxiety increases, trait anger also increases; however, this is not the case for attachment avoidance (which was unrelated to trait anger when controlling for attachment anxiety). Therefore, hypotheses 1.1 and 1.3 were accepted, as attachment anxiety was a significant predictor of trait anger scores. However, hypothesis 1.2 was rejected as self-esteem did not add significant predictive value to our model of trait anger. Further, hypothesis 1.3 was also rejected as the interaction between attachment anxiety and attachment avoidance was non-significant, suggesting that attachment avoidance does not have an impact on the attachment anxiety-trait anger relationship.

3.4 Discussion Study 1a

Bowlby suggested that high trait anger can present as a consequence of the lack of congruency between an individual's underlying goal of proximity and emotional connection, and their explicit effort to avoid such closeness in order to protect themselves from further rejection (Bowlby, 1988). While, theoretically, this seems to

infer that both attachment anxiety and attachment avoidance may be associated with increased levels of trait anger, this was not found to be the case in the present study. In the results of this study, attachment anxiety alone was found to be a significant independent predictor of trait anger, supporting hypothesis 1.1. This is in line with previous studies, which have identified attachment-related differences in self-reported trait anger, in that those who were classified as preoccupied and fearful avoidant (both of which are characterised by high levels of attachment anxiety; Kidd & Sheffield, 2005; Troisi & D'Argenio, 2004), or who scored highly on dimensional measures of attachment anxiety (Calamari & Pini, 2003; Mikulincer, 1998), displayed higher levels of trait anger, suggesting that attachment anxiety may be a stronger risk factor for high levels of dispositional anger than attachment avoidance. This was fully supported in the present study, as attachment avoidance was only related to trait anger when attachment anxiety was not controlled for.

Upon controlling for attachment anxiety, attachment avoidance did not demonstrate a significant relationship with trait anger. This closely reflects previous studies in which attachment avoidance was negatively related to levels of self-reported anger (Diamond et al., 2006; Dozier & Kobak, 1992; Mikulincer & Shaver 2007), and those high in attachment avoidance displayed lower levels of self-reported anger than those high in anxiety and those considered to be securely attached (Mikulincer, 1998). While other studies have identified insecure attachment in general as being significantly related to higher levels of self-reported

trait anger (Dutton et al., 1994; Kobak et al., 1993; Meesters & Muris, 2002; Muris et al., 2004), this appears to most often be down to the use of a combined 'insecurely attached' subscale. The results of this current study suggest that this does not provide a clear picture of the attachment-related differences in trait anger, and that it is important to consider not only how these dimensions act together, but also how they function independently.

The findings from this study also dispute the notion of an 'angry attachment', reflected by high levels of both attachment anxiety and attachment avoidance (Dutton et al., 1994). This also conflicts with Bowlby's early description of an angry form of attachment, fuelled by the contrast of an implicit desire for proximity and an explicit avoidance of interpersonal closeness (suggesting the presence of both attachment anxiety and attachment avoidance) (Bowlby, 1988). However, in the present study, variation in attachment avoidance had no impact on the strength or magnitude of the relationship between attachment anxiety and trait anger. This suggests that attachment anxiety is a unique independent predictor of dispositional anger, while attachment avoidance is not. It could be that attachment avoidance is associated with increased control over the expression of anger, and thus lower explicit anger reporting via self-report measures such as that used in this study. This proposition is supported by research which demonstrates that those who are avoidantly attached have higher anger control, while those who are anxiously attached have higher levels of anger and negative affect in general (Mikulincer,

1998).

Another possible explanation calls upon the abundance of research that suggests that attachment avoidance is associated with a tendency to suppress emotional expression, and possibly even emotional experiences (Caldwell & Shaver, 2012; Mikulincer & Shaver, 2007). If those high in attachment avoidance aim to inhibit the expression of anger, whether consciously or subconsciously, they may be less likely to admit that they experience this emotion at all. By claiming that they do not experience much anger on a day-to-day basis, those high in attachment avoidance can maintain their external veneer of self-reliance and independent stability, and minimise the likelihood of others extending their support or guidance in dealing with anger-inducing situations (Kobak et al., 1993). On the other hand, this is the very attention that those high in attachment-related attachment anxiety strive for (Shaver & Mikulincer, 2007). While this argument makes theoretical sense, little research to date has identified whether this tendency to suppress negative affect also applies in the context of anger.

The finding that attachment anxiety predicts a significant amount of variance in dispositional anger, measured through the use of a self-report measure, suggests that those high in attachment anxiety may be more prone to reporting or admitting experiencing anger regularly. Again, while this study cannot infer why this is the case, one could speculate as to a number of reasons underlying this tendency. For

example, making it explicit that one is experiencing anger as a result of a specific interpersonal situation may elicit a resolution-focused response from those around them. In other words, those close to them may amend or cease their anger-inducing behaviour in an attempt to resolve the situation and reduce that individual's disdain. Indeed, some research does suggest that the expression of one's anger can lead others to concede during interpersonal conflict (Sinaceur & Tiedens, 2006). It is also possible that the display of anger more generally alerts others that the individual is experiencing a certain level of distress and may help those high in attachment anxiety to achieve their goal of close proximity and a more satisfying level of emotional support from those around them (Shaver & Mikulincer, 2007).

Alternatively, it may be that those high in attachment anxiety simply do not possess the skills required to regulate their own anger effectively, and thus cannot suppress or control the extent to which that anger is expressed externally. Those high in attachment anxiety have often failed to develop the skills required to self-regulate emotional experiences, which are normatively developed through the dyadic infant-caregiver relationship, due to their caregiver's inconsistent responsiveness to emotional signals (Calkins & Hill, 2007; Mikulincer, Shaver & Pereg, 2003). This can lead to low levels of confidence and self-efficacy where the self-regulation of emotion is concerned, and often leaves those high in attachment anxiety relying exclusively on others to regulate their emotions for them (Mikulincer & Florian, 1998).

This is supported by the body of literature suggesting that attachment anxiety is associated with difficulties in emotion regulation, often resulting in the dysregulation of both positive and negative emotion such that they present at inappropriate intensities, for inappropriate durations or at inappropriate times (Gross & Thompson, 2007; Lopez, 2001; Mikulincer & Orbach, 1995; Wei et al., 2003; Wei, et al., 2005). It seems most likely, based on previous research on insecure attachment and emotion regulation, that the higher trait anger seen in those with high levels of attachment anxiety is a result of a failure to regulate anger effectively. However, further research is needed to determine how these individuals approach the regulation of anger, specifically, to clarify whether this is the case. Overall, these findings suggest that it is anxiety about the availability and responsiveness of others, paired with a desire for close proximity (i.e. higher attachment anxiety), that is the strongest risk factor for increased levels of dispositional anger.

The second proposition under investigation in this study was the possibility that variants of self-esteem (i.e. self-liking and self-competence) may assist in accounting for additional variance within our attachment model of dispositional anger. This prediction was based on previous findings, which suggest that attachment anxiety is a risk factor for low self-esteem (Bowlby, 1988; Ludmer et al., 2013), and that self-esteem is associated with trait anger and aggression (Donnellan et al., 2005; Fergusson & Horwood, 2002; Sprott & Doob, 2000). While some

research suggests that high self-esteem can present as a risk factor for anger and aggression in instances where that high self-esteem is threatened externally, it was predicted that, in the case of attachment anxiety (which is generally characterised by lower self-esteem; D’Zurilla, Chang & Sanna, 2003), that higher trait anger would more likely be predicted by lower levels of self-esteem. However, self-competence was unrelated to trait anger, and self-liking did not predict significant variance in trait anger scores, thus leading to the rejection of hypothesis 1.2.

Previous research has suggested that attachment anxiety, over attachment avoidance, is most consistently associated with low self-esteem (Brennan & Bosson, 1998; Bylsma et al., 1997; Foster et al., 2007; Man and Hamid, 1998; Park et al., 2004), and the present study supported this, demonstrating a significant negative association between attachment anxiety and both variants of self-esteem. While attachment avoidance initially appeared to demonstrate a similar significant relationship with self-esteem, these associations became non-significant when controlling for attachment anxiety, suggesting that the high intercorrelation between attachment avoidance and attachment anxiety was responsible for this. Therefore, this study provides support, using a dimensional measure of attachment, for a relationship that has been identified with categorical measures; an association between low self-esteem and attachment styles characterised by high attachment anxiety (i.e. preoccupied and fearful-avoidant), but not with those in which there is low attachment anxiety (i.e. secure and dismissing-avoidant).

This study also provides evidence to suggest that the sources of self-esteem (i.e. self- or other-oriented) may not necessarily vary for those high in attachment anxiety and attachment avoidance, as previously thought. It was expected that, while both attachment dimensions would be negatively related to self-esteem, attachment avoidance would be associated more strongly with self-competence (self-oriented), as their model of the self is more positive and they give more weight to independence and self-sufficiency, while attachment anxiety would be associated with self-liking (other-oriented), as their perception of themselves is more socially-dependent and they prescribe more value to how others view them (Park et al., 2004). However, this was not found to be the case in this study, as attachment anxiety was negatively associated with both forms of self-esteem, while attachment avoidance was associated with neither (when attachment anxiety was controlled for). Therefore, high levels of attachment anxiety are equally characterised by a negative perception of the self as unacceptable (as determined by 'perceived' valuation of others), a lack of perceived control and low self-efficacy (as determined by 'perceived' self-competence). This suggests that attachment avoidance may be characterised by an overall more positive model of the self, as suggested by Bartholomew and Horowitz (1991) amongst others, than attachment anxiety.

In the present study, self-liking demonstrated a significant negative association with trait anger, but there was no relationship between self-competence

and trait anger. This suggests that one's socially dependent affective judgment of the self, prescribed by how one believes others view them, may be related to levels of dispositional anger, whereas the perception of capabilities and efficacy in achieving desired goals appears to be less relevant to anger. Thus, a self-derogating perception of the self as not valued by others is related to higher trait anger. This aspect of self-esteem has clear theoretical links to insecure attachment, as both attachment anxiety and attachment avoidance are characterised by a fundamental belief that those close to them do not perceive them as worthy of support and affection (Bartholomew & Horowitz, 1991). However, the relationship between self-liking and trait anger was modest ($r = -.12$), and hierarchical regression suggested that self-esteem did not have any predictive value for dispositional anger. Specifically, self-liking did not predict any additional variance in trait anger scores over and above that predicted by attachment anxiety. This suggests that, while there may be a mild association between self-liking and dispositional anger (similar to that found by Arslan, 2009), this relationship is not strong enough to be predictive. Indeed, it is suggested that actual level of self-esteem is less relevant for dispositional anger than stability of self-esteem (Mikulincer et al., 2007). There is a growing indication within the self-esteem literature that low self-esteem is not necessarily a risk factor for anger and aggression in and of itself, but that a chronic fluctuation in self-esteem is more problematic and has a higher impact on well-being and emotional functioning (Webster et al., 2007). However, as stability of self-esteem was not measured in this study, this cannot be clarified further at this point.

The majority of literature discussing the possible relationship between insecure attachment and anger up to this point has been largely theoretical (e.g. the works of John Bowlby; Mikulincer & Shaver, 2008), with only a few empirical studies investigating the nature of this relationship. This study provides preliminary evidence to suggest that attachment-related anxiety is a unique independent predictor of dispositional anger, while attachment avoidance is not. This has important implications for anger-related therapy, suggesting that working towards reducing a client's level of attachment anxiety, and increasing their attachment security, may facilitate a reduction in the frequency and intensity of anger.

3.5 Conclusion Study 1a

The aim of Study 1a was to determine the extent to which variation in adult attachment dimensions could predict variation in dispositional anger. The findings indicate that attachment anxiety is a unique independent predictor of dispositional anger, and the neither attachment avoidance nor self-esteem contribute significantly to this model of trait anger. This suggests that those high in attachment anxiety are more likely to experience frequent and intense episodes of anger on a day-to-day basis, regardless of their level of self-esteem or attachment avoidance. While the findings of this present study seem to reflect the expressive/suppressive attachment-related differences often found when measuring the regulation of negative emotion, further research is needed to clarify the regulation strategies

used by those high in attachment anxiety and attachment avoidance in the context of anger before assumptions can be made.

Thus, Study 1b will aim to investigate the relationship between insecure attachment and anger regulation strategies. Further, Study 1b will investigate how the regulation strategies used are related to individual differences in the aggressive expression of anger.

Chapter 4. Study 1b: Adult attachment and dispositional aggression: The mediating role of anger regulation processes

4.1 Introduction Study 1b

The purpose of Study 1b was to investigate whether there were attachment-related differences in aggression (hostility, physical aggression and verbal aggression), and to identify whether the use of specific anger regulation processes (under-regulation, suppression, and anger control) mediated the associations between insecure attachment and aggression. Research suggests that attachment theory may provide a valuable framework for understanding the experience and expression of anger. Firstly, prior literature suggests that attachment anxiety is associated with elevated levels of dispositional anger (e.g. Critchfield et al., 2008; Kidd & Sheffield, 2005; Mikulincer, 1998). This was supported by the findings of Study 1a, in which attachment anxiety was an independent predictor of trait anger scores. Further, research in a variety of context points towards a relationship, although somewhat inconsistently, between both attachment insecurity dimensions and aggressive behaviour (e.g. domestic violence; Bartholomew & Allison, 2006; Mikulincer, 2007). However, the literature on attachment insecurity and aggression in the normal population, as opposed to those already identified as violent aggressors (e.g. clinical or forensic samples), is sparse. In order to address this disparity, the present study adopted a general population sample, in an attempt to identify discrete attachment-related differences in aggression; the identification of which may inform early intervention/prevention efforts for those at risk of escalating aggressive behaviour.

The potential for anger to be expressed through aggressive means depends largely on how that anger is regulated by the individual (Novaco, 1976). Both theoretical and empirical literature presents a convincing argument for attachment-related differences in emotion regulation (Schore & Schore, 2008), and thus provide a useful foundation from which to develop an understanding of specific anger regulation processes. Research consistently suggests that attachment anxiety is linked to a hyperactivating approach to emotion, resulting in hypervigilance for emotion-related threats and the purposeful under-regulation (whether consciously or unconsciously) of emotional expression with the aim of achieving proximity to and support from potential supportive others (Bartholomew & Horowitz, 1991). By contrast, attachment avoidance is concordant with a deactivating approach, curtailing attention to potentially threatening information and suppressing emotional responses as they occur in order to minimise appearance of a need for social support and reduce the likelihood of rejection-related distress when such support is unavailable (Kobak et al., 1993; Wei et al., 2005). Despite being goal-appropriate, both the under-regulation and suppression of emotion have been recurrently linked with a vast number of negative outcomes for these individuals, such as elevated negative affect, rumination over traumatic events, increased access to negative emotion memories and interference with adaptive cognitive processes such as memory and decision making (e.g. Berant et al., 2001; Fraley, Garner & Shaver, 2000; Mikulincer, Birnbaum, Woddis & Nachmias, 2000; Mikulincer & Florian, 1998; Mikulincer, Gillath, & Shaver, 2002; Mikulincer & Shaver, 2003; Mikulincer et al., 2003; Mikulincer et al., 2004; Shaver & Mikulincer, 2007).

However, the relationship between attachment insecurity and anger regulation specifically is less clear. Some studies suggest that their regulation patterns remain the same as in other emotional contexts (e.g. Diamond & Hicks, 2005; Diamond et al., 2006), whilst there is a strong theoretical argument that alternative regulatory approaches may be more goal-congruent in the case of anger (Braet & Branning, 2013). Therefore, the aim of Study 1b was to use additional data collected in Study 1a to determine whether the attachment dimensions were differentially associated with specific anger regulation strategies in a similar way to other emotional contexts (e.g. sadness, attachment-related distress; Demaree et al., 2006; Gross & Levenson, 1995), and to ascertain whether the use of specific anger regulation strategies (suppression, under-regulation and anger control) played a mediating role in the relationship between attachment insecurity and three facets of dispositional aggression (physical aggression, verbal aggression and hostility). The aim of this study was to afford a clearer understanding of whether the under-regulation and/or suppression of anger may lead to aggressive behaviour in the context of insecure attachment. Based on the literature above, seven specific hypotheses were considered in this study:

Hypothesis 2.1: Attachment anxiety will be associated with the under-regulation of anger

Hypothesis 2.2: Attachment avoidance will be associated with the suppression of anger

Hypothesis 2.3: Attachment anxiety will be a significant predictor of physical aggression

Hypothesis 2.4: Attachment avoidance will be a significant predictor of physical aggression

Hypothesis 2.5: Attachment avoidance will be a significant predictor of hostility

Hypothesis 2.6: The under-regulation of anger will mediate the relationship between attachment anxiety and associated aggression variables

Hypothesis 2.7: The suppression of anger will mediate the relationship between attachment avoidance and associated aggression variables

4.2 Method Study 1b

4.2.1 Participants

The same participant sample as employed in Study 1a was utilised for the current study. As mentioned previously, following ethical approval from Queen Margaret University's ethics panel (see Appendix 1a), data were collected from a sample of 270 individuals (80.7% female; 56.5% students; 86.7% English as first language) with an average age of 29.2 years old (SD = 9.78; range = 18-63 years). This sample size was in line with an a-priori power analysis, conducted using G* Power 3.1, which suggested a sample of at least 92 was required to achieve 80% power in detecting a medium effect size in the regression and mediation analysis (based on an alpha of .05). This power analysis was based on 5 predictors (attachment anxiety,

attachment avoidance, anger suppression, under-regulation and anger control). As with study 1a, a medium effect size was expected given the literature showing a range of small to medium effects in the relationship between attachment and emotion/emotion regulation related variables across a range of domains (e.g. Cooper & Shaver, 1998; David, Shaver & Vernon, 2003; Kafetsios, 2004; Meredith, Strong & Feeney, 2006; Trub & Starks, 2017).

4.2.2 Procedure

The data for Study 1b was collected simultaneously alongside the data for Study 1a. As such, alongside the additional measures below, the attachment measure used in Study 1a (ECR-R; Fraley et al., 2000b) was also utilised for the current study. As outlined below, the STAXI-2 was also used in this study, but different subscales were analysed in line with the aims of this study (i.e. to investigate anger regulation strategies, as opposed to levels trait anger). The information sheet, consent form and debrief sheet were displayed as outlined in Study 1a (see appendices 2a, 3a and 4a).

4.2.3 Measures

(i) Adult Attachment: Experiences in Close Relationships Revised scale (ECR-R; Fraley et al., 2000b)

As outlined in Study 1a, the ECR-R is a 36-item self-report tool that measures adult attachment two dimensions: attachment anxiety (e.g. I often worry that my partner will not want to stay with me) and attachment avoidance (e.g. I prefer not to be too close to romantic partners) (Brennan et al., 1998). In the present study, the attachment anxiety and attachment avoidance subscales demonstrated strong alpha coefficients of $\alpha = .94$ and $\alpha = .95$, respectively.

(ii) Anger: State-Trait Anger Expression Inventory-2 (STAXI-2; Spielberger et al., 1999)

In this study, the anger expression subscale of the STAXI-2 was used to assess the use of specific anger regulation strategies. The anger expression scale has two subscales: Anger expression and anger control. These scales assess four relatively independent traits:

- Anger Expression Out (AX-Out) – a tendency to under-regulate angry feelings such that they are expressed externally towards other persons or objects in the environment (e.g. “I strike out at whatever infuriates me”)
- Anger Expression In (AX-In) – a tendency to suppress angry feelings (e.g. “I tend to harbour grudges that I don’t tell anyone about”)
- Anger Control Out (AC-Out) – attempts to control angry feelings by preventing the expression towards other persons or objects in the environment (e.g. “I control my urge to express my angry feelings”)
- Anger Control In (AC-In) – attempts to control angry feelings by calming down or

cooling off (e.g. “I take a deep breath and relax”)

For the purposes of this study AC-In and AC-Out were subsumed into a single scale of anger control (referred to here as *anger control*). Furthermore, for clarity of reading, and to allow for ease of comparison with previous literature, the AX-Out and AX-In variables will be referred to herein as anger under-regulation (AX-Out) and anger suppression (AX-In). Participants responded to the above items on a 4-point Likert-scale ranging from 1 (almost never) to 4 (almost always), reflecting how they “generally react or behave when angry or furious”. Culhane and Morera (2010) proposed that population norms for these subscales fall around 17.2 for suppression, 15.8 for under-regulation, and 22.7 (averaged) for anger control, and found internal consistencies of $\alpha = .73$ for suppression, $\alpha = .75$ for under-regulation, and $\alpha = .87$ and $\alpha = .85$ for AC-In and AC-Out, respectively. To the researcher’s knowledge, this is the first study to combine the AC-In and AC-Out scores to reflect comprehensive anger control, and thus there is no previous internal consistency data to report for this item. However, Cronbach’s alpha coefficients for these subscales in the present study were as follows: suppression ($\alpha = .81$); under-regulation ($\alpha = .71$); and anger control ($\alpha = .88$), all demonstrating good internal consistency and confirming the validity of the combined anger control scale. Licensing permissions were received from PAR Inc., and a copyright notice was displayed on the survey window (see Appendix 5).

(iii) Aggression: Aggression Questionnaire (AQ; Buss & Warren, 2000)

The AQ is a 34-item questionnaire that measures physical aggression (e.g. Once in a while I can't control the urge to strike another person), verbal aggression (e.g. I have threatened people I know), hostility (e.g. I wonder why sometimes I feel so bitter about things) and anger (e.g. Some of my friends think I'm a hothead). However, as dispositional anger was being measured by the trait anger subscale of the STAXI-2, the anger subscale of the AQ was not applied in this study. Scores on this questionnaire can also be combined to provide a total aggression score, however, this was not used in the present study as specific facets of aggression were of more interest. Participants respond to items on a 5-point Likert-scale ranging from 1 (not at all like me) to 5 (completely like me). Higher scores reflect higher levels of each construct. Scores can range from 0-144, and norms, as established by Buss and Perry in a sample of 1,253 undergraduate students, are 24.3 (for males) and 17.9 (for females) for physical aggression, 15.2 (for males) and 13.5 (for females) for verbal aggression and 21.3 (for males) and 20.2 (for females) for hostility (Buss & Perry, 1992). An evaluation of the validity and reliability of the AQ revealed alpha values of $\alpha = .85$ for physical aggression, $\alpha = .72$ for verbal aggression, $\alpha = .77$ for hostility and $\alpha = .83$ for anger (Harris, 1997). In the present study, the internal consistencies of these subscales were as follows: physical aggression, $\alpha = .84$; verbal aggression, $\alpha = .84$; and hostility, $\alpha = .89$.

4.2.4 Analytical strategy

The data for this study were analysed using SPSS 21. Firstly, data screening took place, to identify any outliers and determine the distribution of the data (outlined below). Then descriptive statistics and correlations were conducted to investigate the univariate relationships between attachment dimensions, anger regulation processes and aggression variables. This stage of the analysis addressed hypotheses 2.1 (that attachment anxiety would be associated with the under-regulation of anger) and 2.2 (that attachment avoidance would be associated with anger suppression). Secondly, to address hypotheses 2.3 (that attachment anxiety would predict variance in physical aggression scores), 2.4 (that attachment avoidance would predict variance in physical aggression scores) and 2.5 (that attachment avoidance would predict variance in hostility scores), multiple regression analyses were performed to investigate the attachment dimensions are predictors of the aggression variables. Finally, mediation analyses were conducted to identify whether specific anger regulation processes mediated the relationships between the attachment dimensions and the aggression variables. This final analysis addressed hypotheses 2.6 (that the under-regulation of anger would mediate the relationship between attachment anxiety and aggression variables) and 2.7 (that anger suppression would mediate the relationship between attachment avoidance and aggression variables).

4.3 Results Study 1b

4.3.1 Data screening

As in study 1b, Z-scores were calculated for all variables measured using SPSS and scores in excess of ± 3.29 were considered to be outliers (Tabachnick and Fidell, 2007). This revealed that one participant was an outlier on trait anger ($z = 3.51$), anger control ($z = -3.53$) and under-regulation ($z = 4.45$). However, upon further inspection, there were no notable issues with these individual responses and thus they were not deemed worthy of removal from the sample. Therefore, the final sample remained at $n=270$. Skewness statistics were used to determine whether data for each variable were normally distributed. Variable scores are considered to be normally distributed if the skewness statistic falls within the range of \pm twice the Std. Error of Skewness. As the Std. Error of Skewness for this data was reported in the descriptive analyses as .149, the normal range was $-.298$ to $+.298$. In line with this range anger control, anger suppression, verbal aggression and hostility were all normally distributed. However, attachment anxiety, attachment avoidance, under-regulation and physical aggression were all non-normal and positively skewed (see Table 4). However, as the sample size was relatively large, this was not thought to be an issue for conducting the impending multiple regression analyses as the residuals were normally distributed.

4.3.2 Descriptive statistics

Age and gender

Descriptive statistics and correlations for the main study variables are displayed in Table 4. Cohen's (1988) standards for Pearson's correlation coefficient effect size were used to determine the strength of the effects (i.e. small, $r = .1$; medium, $r = .3$; large, $r = .5$). Independent samples t-tests were used to examine gender differences for all main study variables. As expected (Buss & Perry, 1992) males scored significantly higher on physical aggression ($t(266) = 4.821, p < .001$) and verbal aggression ($t(266) = 2.734, p = .007$). Age was negatively correlated with suppression ($r = -.19, p = .002$), under-regulation ($r = -.14, p = .025$), physical aggression ($r = -.18, p = .004$) and hostility ($r = -.20, p = .001$), all with small to medium effect sizes, suggesting that age is associated with decreasing levels of maladaptive anger regulation strategies (suppression and under-regulation), and two aspects of trait aggression (physical aggression and hostility).

Measure inter-correlations, internal consistency and norms

As discussed in the results of Study 1a, attachment anxiety and attachment avoidance subscales of the ECR-R were positively inter-correlated with a medium to

large effect size ($r = .46, p < .001$), as prior research indicates (Fraley, 2010). Average scores for both attachment avoidance ($m = 2.96, SD = 1.21$) and attachment anxiety ($m = 3.00, SD = 1.23$) were in line with what was expected based on previous normal population samples ($m = 2.92, SD = 1.19$; and $m = 3.56, SD = 1.12$, respectively; Fraley, 2012). The following anger regulation process subscales of the STAXI-2 were significantly correlated with one another. Anger control (adaptive anger regulation strategy) demonstrated a significant negative relationship with under-regulation ($r = -.29, p < .001$; medium effect), suggesting that an effortful attempt to control anger is associated with lower levels of under-regulation. Additionally, suppression and under-regulation (maladaptive anger regulation strategies) were positively related with one another ($r = .16, p = .01$; small effect). This suggests that the use of one maladaptive strategy is associated with a higher likelihood of using the other. Mean scores for the STAXI, seen in Table 4, were as follows: effortful control ($m = 34.70, SD = 6.38$) suppression ($m = 18.35, SD = 4.94$), under-regulation ($m = 14.72, SD = 3.49$). Under-regulation is relatively in line with what was expected ($m = 14.09, SD = 3.70$ for females, $m = 15.42, SD = 3.74$ for males; Spielberger et al., 1999), while suppression was considerably higher in this sample than in previous (females = $m = 15.86, SD = 4.36$; males = $m = 16.35, SD = 3.99$; as above). As anger control was a combined scale created for this study, there are no previous means available for comparison.

Finally, the subscales of the Aggression Questionnaire (AQ) demonstrated the following significant inter-correlations. Physical and verbal aggression were positively associated ($r = .45, p < .001$; medium to large effect), while hostility was

positively related to both physical ($r = .44, p < .001$; medium to large effect) and verbal aggression ($r = .27, p < .001$; medium effect). Mean physical ($m = 18.83, SD = 7.79$) and verbal ($m = 15.06, SD = 5.32$) aggression scores were in line with previous norms (while hostility ($m = 22.18, SD = 9.10$) was slightly above what was expected ($m = 21.3, SD = 5.5$ for males, $m = 20.2, SD = 6.3$ for females; Buss & Perry, 1992). Overall, this sample were relatively average in their attachment scores (as outlined in study 1a) and the outward expression of anger (under-regulation), but were higher than expected in their levels of anger suppression. The sample were also in line with expected scores on physical and verbal aggression, but scored marginally higher than average on levels of hostility. However, no statistical tests were carried out to determine whether differences between present and previous samples were significant, and so this can only be considered at trend level.

4.3.3 Relationships between attachment dimensions, anger regulation and aggression variables

Associations between the attachment dimensions and anger regulation

Hypothesis 2.1 predicted that attachment anxiety would be associated with the under-regulation of anger; while hypothesis 2.2 expected that attachment avoidance would be associated with the suppression of anger. Pearson's correlations demonstrated significant associations between attachment insecurity and anger regulation variables (see Table 4). Attachment anxiety was positively and

significantly correlated with suppression ($r = .38, p < .001$; medium to large effect) and under-regulation ($r = .13, p = .036$; small effect), and negatively with anger control ($r = -.14, p = .024$; small effect). This indicates that attachment anxiety is associated with increased maladaptive anger regulation, and reduced adaptive anger regulation. Attachment avoidance was positively correlated with suppression ($r = .31, p < .001$; medium effect), suggesting that attachment avoidance is specifically associated with increased anger suppression. These findings support both of the hypotheses outlined above, as attachment anxiety was associated with under-regulation, while attachment avoidance was related to suppression. However, attachment anxiety also displayed significant correlations with suppression and anger control.

Associations between the attachment dimensions and aggression variables

Attachment anxiety was positively correlated with physical aggression ($r = .13, p = .029$; small effect) and hostility ($r = .48, p < .001$; large effect). Similarly, attachment avoidance demonstrated significant positive correlations with both physical aggression ($r = .12, p = .043$; small effect) and hostility ($r = .21, p < .001$; small to medium effect). Neither attachment dimension was significantly related to verbal aggression.

Associations between anger regulation strategies and aggression variables

Anger control was negatively associated with physical aggression ($r = -.27, p < .001$; medium effect), verbal aggression ($r = -.22, p < .001$; small to medium effect) and hostility ($r = -.27, p < .001$; small to medium effect), supporting the argument that this reflects an adaptive anger regulation strategy. The maladaptive anger regulation strategies of suppression and under-regulation were positively related to aggression variables, suggesting that maladaptive anger regulation is associated with increased physical aggression, verbal aggression and hostility. Under-regulation was positively associated with all three aggressive outcome variables with medium to large effect sizes ($r = .41, p < .001$; $r = .54, p < .001$; and $r = .30, p < .001$, respectively), while suppression was significantly related to physical aggression ($r = .13, p = .030$; small effect) and hostility ($r = .49, p < .001$; large effect).

Table 4. Descriptive statistics and Pearson's correlations among main variables (n = 270).

		Mean	SD	Skewness	Kurtosis	1	2	3	4	5	6	7	8	9
	1. Age	29.19	9.78	1.41	1.33	1	-.08	.05	.03	-.19**	-.14*	-.18**	-.06	-.20**
ECR-R	2. Attachment anxiety	3.00	1.23	.369	-.404		1	.46**	-.14*	.38**	.13*	.13*	.07	.48**
	3. Attachment avoidance	2.96	1.21	.503	-.515			1	.02	.31**	.11	.12*	.10	.21**
STAXI-2	4. Anger control	34.70	6.38	-.098	-.427				1	-.09	-.29**	-.27**	-.22**	-.27**
	5. Suppression	18.35	4.94	.297	-.500					1	.16*	.13*	-.01	.49**
	6. Under-regulation	14.72	3.49	.629	.375						1	.41**	.54**	.30*
AQ	7. Physical aggression	18.83	7.79	1.125	.978							1	.45**	.44**
	8. Verbal aggression	15.06	5.32	.188	-.911								1	.27**
	9. Hostility	22.18	9.10	.202	-.979									1

* p < .05, ** p < .01

4.3.4 Attachment anxiety and attachment avoidance as predictors of aggression variables

Further hypothesis proposed that both attachment anxiety (hypothesis 2.3) and attachment avoidance (hypothesis 2.4) would be positively associated with physical aggression, whilst hypothesis 2.5 proposed that attachment avoidance alone would be associated with hostility. Attachment and aggression variables that were associated at $p < .10$ at the univariate level were selected as candidates for the following multivariable models, as it is suggested that the significance value should be relaxed when selecting variables for multiple regression as traditional significance limits (e.g. $p < .05$) can often fail to demonstrate significance in variables known to be important predictors (Bursac et al., 2008). As recommended by Cohen (1988) for regression analysis, an effect size of $R^2 = .02$ was considered to be a small effect, $R^2 = .15$ was considered a medium effect and $R^2 = .35$ was deemed to be a large effect.

Firstly, to test hypotheses 2.3 and 2.4, hierarchical multiple regression was carried out to determine whether attachment anxiety and attachment avoidance predicted physical aggression scores, controlling for age and gender (see Table 5). Preliminary analyses were carried out to ensure that the data did not violate the assumptions of multicollinearity, independent errors, non-zero variances, normality, homoscedacity and linearity. Analysis of standard residuals did identify one outlier (Std. Residual Min = -2.485, Std. Residual Max = 3.358), with a Std. residual of 3.358

for physical aggression. However, as mentioned earlier, this case was not removed from the sample as it was deemed to reflect individual differences and not an issue with the data for this participant. Further analysis revealed no issues with multicollinearity, as variance inflation factor (VIF) values were all below 5 (as recommended by Heirberger & Holland, 2013) and Tolerance statistics all exceeded 0.1 (the minimum level recommended by Tabachnick & Fidell, 2001). The assumption of independent errors was also met, with a Durbin-Watson statistic within the accepted range (1.983), as was that of non-zero variances. Both the histogram and the normal P-P plot of standardized residuals suggested normally distributed errors, and a scatterplot of standardised predicted values confirmed that the data were homoscedastic and linear. Therefore, this data was deemed suitable for regression analysis.

At Step 1, age and gender accounted for a significant proportion of the variance ($R^2=.12$, $p<.001$; small to medium effect). The addition of attachment anxiety and attachment avoidance to the regression equation resulted in a significant increase to R^2 ($R^2=.15$, $R^2_{\text{change}}=.03$, $p=.009$; medium effect). However, attachment anxiety ($\beta=.12$, $p=.092$) and attachment avoidance ($\beta=.10$, $p=.123$) were not significant independent predictors within the model. Therefore, both age and gender account for 14% variance in physical aggression, suggesting that physical aggression reduces with age, and is associated with being male (as gender was coded as 1: males and 2: female). However, neither attachment anxiety nor

attachment avoidance had an independent effect on self-reported physical aggression. This does not lend support for hypotheses 2.3 or 2.4.

Table 5. Hierarchical multiple regression analysis predicting physical aggression scores with attachment anxiety and attachment avoidance, controlling for age and gender (n= 270)

	R^2	ΔR^2	F_{change}	R^2_{change}	β	95% CI	
						LL	UL
<i>Step 1</i>	.12	.11	18.00***	.12			
Age					-.22***	-.27	-.09
Gender					-.29***	-8.17	-3.58
<i>Step 2</i>	.15	.14	4.81**	.03			
Age					-.22***	-.27	-.08
Gender					-.31***	-8.46	-3.92
Attachment Anxiety					.12	-.12	1.51
Attachment Avoidance					.10	-.18	1.49

* $p < .05$; ** $p < .01$; *** $p < .001$

A second hierarchical multiple regression was carried out to determine whether attachment anxiety and attachment avoidance predicted hostility scores, controlling for age and gender (see Table 6). Once again, preliminary analyses were carried out to ensure that the assumptions of multicollinearity, independent errors, non-zero variances, normality, homoscedacity and linearity were not violated in this model. Analysis of standard residuals revealed no outliers were present (Std. Residual Min = -2.234, Std. Residual Max = 2.340). Further analysis revealed no issues with multicollinearity, as variance inflation factor (VIF) values were all below 5

(as recommended by Heirberger & Holland, 2013) and Tolerance statistics all exceeded 0.1 (the minimum level recommended by Tabachnick & Fidell, 2001). The assumption of independent errors was also met, with a Durbin-Watson statistic within the accepted range (2.017), as was that of non-zero variances. Further, the histogram and the normal P-P plot of standardized residuals demonstrated normally distributed errors, and a scatterplot of standardised predicted values suggested that the data were homoscedastic and linear in nature. Therefore, this data was considered acceptable for regression modelling.

At Step 1, age and gender accounted for a statistically significant proportion of the variance ($R^2=.04$, $p=.003$; small effect); with age presenting as a unique significant predictor of hostility ($\beta=-.21$ $p=.001$). The addition of attachment variables at step 2 resulted in a significant increase to R^2 ($R^2=.26$, $R^2_{\text{change}}=.25$, $p<.001$; medium to large effect). At step 2, age ($\beta=-.17$ $p=.002$) and attachment anxiety ($\beta=.47$, $p<.001$) were significant predictors of hostility. Therefore, both age and attachment anxiety account for 25% variance in hostility scores, suggesting that hostility reduces with age, and increases with attachment anxiety. However, neither gender nor attachment avoidance had an independent effect on self-reported hostility. Therefore, hypothesis 2.5, which proposed that attachment avoidance would be a significant predictor of hostility scores, must be rejected.

Table 6. Hierarchical multiple regression analysis predicting hostility scores with attachment anxiety and attachment avoidance, controlling for age and gender (n= 270)

	R^2	ΔR^2	F_{change}	R^2_{change}	B	95% CI	
						LL	UL
<i>Step 1</i>	.04	.04	.04				
Age					-.21**	-.31	-.08
Gender					-.02	-3.18	2.33
<i>Step 2</i>	.26	.25	39.54				
Age					-.17**	-.26	-.06
Gender					-.05	-3.61	1.26
Attachment Anxiety					.47***	2.61	4.35
Attachment Avoidance					.01	-.84	.95

* $p < .05$; ** $p < .01$; *** $p < .001$

4.3.5 Anger regulation processes as mediators in the relationship between attachment dimensions and aggression variables

Parallel mediation analyses were conducted, using Hayes' (2013) PROCESS add-on for SPSS, to determine whether specific anger regulation strategies mediate the relationships between the attachment dimensions and aggression variables found in the regression models above (see Table 7). Mediation analysis allows the determination of whether a specific initial predictor (the independent variable) influences a final effect (the dependant variable) indirectly through an alternative, more direct, causal factor (the mediator/s) (Criss, 2001). As discussed above, preliminary analyses indicated that the data did not violate the assumptions of multicollinearity, independent errors, non-zero variances, normality, homoscedacity and linearity, and thus was deemed suitable for mediation analysis. While researchers have traditionally posited that mediation and moderation analysis

should only be explored in the presence of a significant total X-Y effect (Baron & Kenny, 1986; Frazier et al., 2004), a growing body of literature argues that this is not a valid exclusion criterion. Instead, Rucker and colleagues (2011) suggest that this 'first step' should be discarded, and instead focus should be on the theoretical support for the proposed mediation or moderation model (Rucker, Preacher, Tormala & Petty, 2011). Further, this proposition is supported widely within recent literature with researchers suggesting that, regardless of the presence of a significant total effect, focus should be on the significance of the indirect effect (using bootstrapped confidence intervals) and the magnitude of that indirect effect (Hayes, 2009; MacKinnon et al., 2000; Rucker et al., 2011; Shrout & Bolger, 2002; Zhao et al., 2010).

Therefore, bootstrapping methods with 10,000 bootstrap samples were used to assess the significance of the indirect effect of the independent variables (IV; attachment anxiety and attachment avoidance) on the dependent variables (DVs; physical aggression and hostility) via the suggested mediators (M; suppression, under-regulation and anger control), even in the absence of a significant IV -> DV total effect. Indirect effects are unstandardized coefficients, which are considered to be significant when zero is not present in the 95% confidence interval. According to Preacher and Kelley (2011), completely standardised indirect effect beta values can be utilised in mediation analysis to determine the effect size of each indirect effect. As mentioned previously, Kenny (2016) suggests that Cohen's effect size standards are squared where mediation is concerned, and so the standards for effect size used

in this study were $ab_{cs} = .01$ (small effect), $ab_{cs} = .09$ (medium effect) and $ab_{cs} = .25$ (large effect).

Firstly, a model was developed to determine the mediating role of anger regulation strategies in the relationship between attachment anxiety and physical aggression, controlling for age and gender. Results demonstrated that attachment anxiety had a significant indirect effect on physical aggression through under-regulation; $\beta = .31$, BCa CI [.02, .73] ($ab_{cs} = .05$, suggesting a small to medium effect), and through anger control; $\beta = .17$, BCa CI [.03, .42] ($ab_{cs} = .03$, again suggesting a small to medium effect), with no significant difference between the strength of the mediators was identified (significant contrast between mediator strength; $b = -0.14$, 95% CI [-0.56, 0.16]). Anger suppression was not a significant mediator of this relationship; $\beta = .04$, BCa CI [-.20, .32]. A second model revealed that neither under-regulation; $\beta = .24$, BCa CI [-.04, .62], anger control; $\beta = -.01$, BCa CI [-.19, .14], nor anger suppression; $\beta = .01$, BCa CI [-.22, .26] were significant mediators of the relationship between attachment avoidance and physical aggression (once again controlling for age and gender).

A third model revealed that there was also an indirect effect of attachment anxiety on hostility through under-regulation; $\beta = .16$, BCa CI [.01, .42] ($ab_{cs} = .02$, indicating a small effect), anger suppression; $\beta = .87$, BCa CI [.52, 1.34] ($ab_{cs} = .12$, suggesting a medium to large effect), and anger control; $\beta = .16$, BCa CI [.03, .41] ($ab_{cs} = .02$, indicating a small effect). In this model, anger suppression demonstrated

the strongest effect, mediating a significantly higher proportion of variance than both anger control (significant contrast between mediator strength; $b = -0.71$, 95% CI $[-1.23, -0.30]$) and under-regulation (significant contrast between mediator strength; $b = 0.71$, 95% CI $[0.29, 1.20]$). A final model was constructed to identify mediators in the relationship between attachment avoidance and hostility. It was found that attachment avoidance had an indirect effect on hostility, through anger suppression; $\beta = 1.00$, BCa CI $[\.56, 1.54]$ ($ab_{cs} = .13$, indicating a medium to large effect). However, under-regulation; $\beta = .14$, BCa CI $[-.02, .38]$ and anger control; $\beta = -.02$, BCa CI $[-.21, .14]$ were not significant mediators of this relationship.

Therefore, attachment-related differences have been demonstrated in physical aggression (see Figure 4) and hostility (See Figures 5 and 6), through differential anger regulation strategies as outlined above. However, attachment avoidance was not a significant direct or indirect predictor of physical aggression.

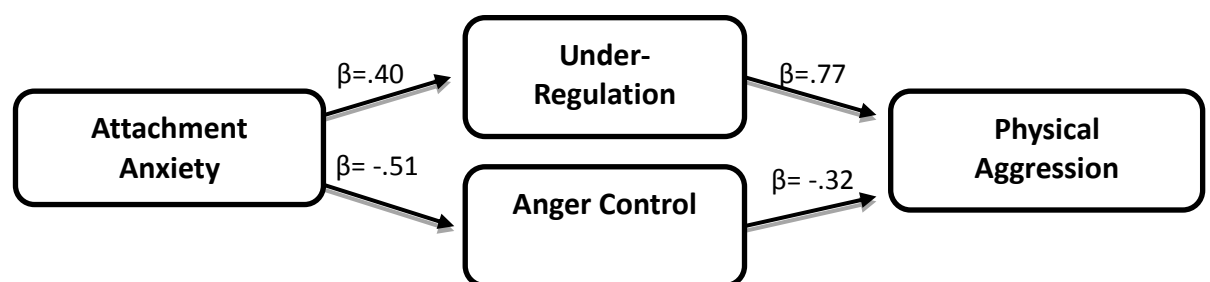


Figure 4. Indirect relationship between attachment anxiety and physical aggression, through anger control and under-regulation

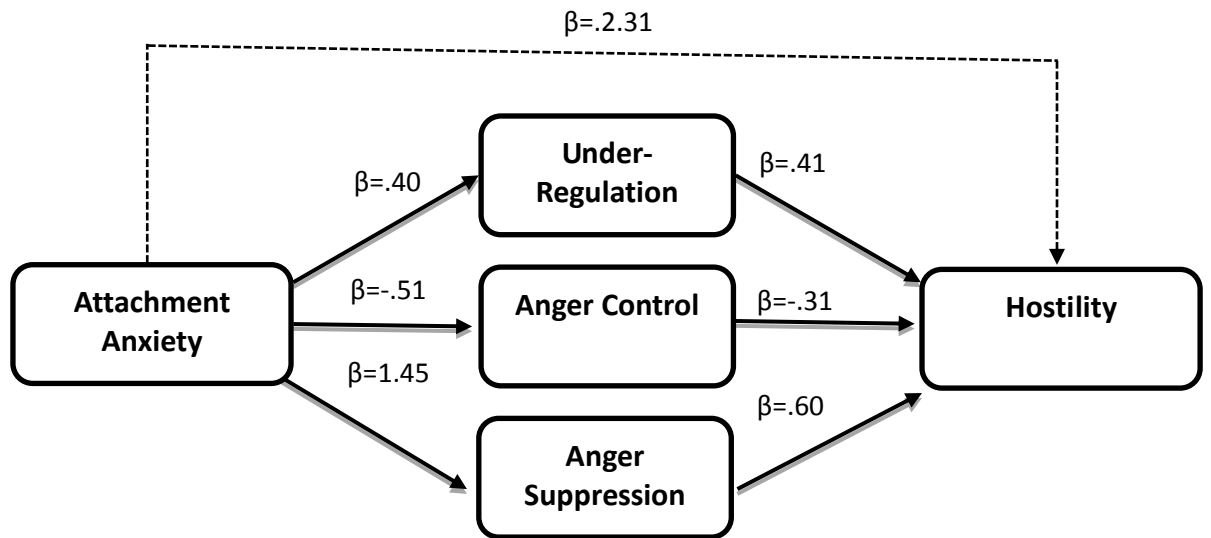


Figure 5. Anger suppression, anger control and under-regulation as mediators in the relationship between attachment anxiety and hostility. Note: Broken line represents significant direct relationship

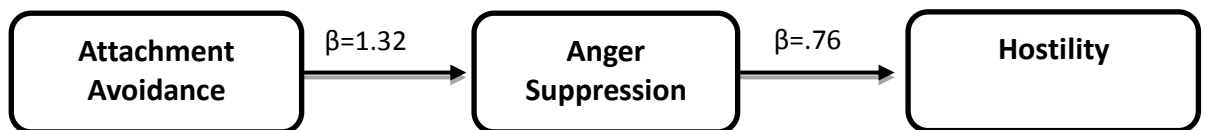


Figure 6. Indirect relationship between attachment avoidance and hostility, through anger suppression

Table 7. Mediation analysis examining the indirect effects of insecure attachment on aggression variables, via anger suppression, under-regulation and anger control

	Unstandardized parameter estimate	SE	95% CI (LL, UL)
<i>Attachment Anxiety on Physical Aggression</i>			
Total effect	.96*	.44	.09, 1.82
Direct effect	.32	.39	-.45, 1.09
Indirect total effect	.64*	.25	.15, 1.15
Indirect effect via anger suppression	.12	.15	-.14, .46
Indirect effect via under-regulation	.35*	.18	.04, .77
Indirect effect via anger control	.17*	.10	.03, .44
<i>Attachment Avoidance on Physical Aggression</i>			
Total effect	.76	.41	-.05, 1.57
Direct effect	.45	.36	-.27, 1.16
Indirect total effect	.31	.24	-.16, .80
Indirect effect via anger suppression	.10	.12	-.11, .38
Indirect effect via under-regulation	.23	.17	-.08, .59
Indirect effect via anger control	-.02	.08	-.19, .14
<i>Attachment Anxiety on Hostility</i>			
Total effect	3.58*	.38	2.85, 4.32
Direct effect	2.29*	.39	1.51, 3.06
Indirect total effect	1.30*	.26	.82, 1.88
Indirect effect via anger suppression	.95*	.22	.57, 1.42
Indirect effect via under-regulation	.19*	.10	.03, .44
Indirect effect via anger control	.16*	.09	.02, .39
<i>Attachment Avoidance on Hostility</i>			
Total effect	1.58*	.47	.65, 2.51
Direct effect	.45	.44	-.42, 1.32
Indirect total effect	1.13*	.31	.56, 1.76
Indirect effect via anger suppression	1.01*	.25	.55, 1.53
Indirect effect via under-regulation	.14	.10	-.03, .41
Indirect effect via anger control	-.02	.08	-.21, .14

* significant pathway

4.3.6 Summary of analyses

Hypotheses 2.1 and 2.2 were both accepted as attachment anxiety was significantly associated with the under-regulation of anger, while attachment avoidance was related to anger suppression. However, attachment anxiety also displayed significant correlations with anger suppression and anger control. Regression analyses

demonstrated that neither attachment anxiety nor attachment avoidance had an independent effect on self-reported physical aggression, suggesting the rejection of hypotheses 2.3 and 2.4. However, mediation analyses demonstrated that attachment anxiety had a significant indirect effect on physical aggression through under-regulation and anger control, with under-regulation demonstrating the strongest effect. This lends support for hypothesis 2.6, which proposed that under-regulation would mediate the relationships between attachment anxiety and aggression variables. Further indirect effects analysis indicated that attachment avoidance was neither directly nor indirectly associated with physical aggression (thus rejecting hypothesis 2.5). Under-regulation, anger suppression and anger control were found to be significant mediators in the relationship between attachment anxiety and hostility, with anger suppression demonstrating the strongest mediating effect. Finally, attachment avoidance was found to be indirectly (but not directly) associated with hostility through anger suppression. This lends support for hypothesis 2.7, as attachment avoidance was a predictor of hostility, but only indirectly through anger suppression.

4.4 Discussion Study 1b

The purpose of the present study was to investigate whether there were attachment-related differences in aggression (hostility, physical aggression and verbal aggression), and to identify whether the use of specific anger regulation

processes (under-regulation, anger suppression, and anger control) mediated the associations between attachment insecurity and aggression. In line with previous research, both attachment dimensions were significantly related to increased hostility either directly (in the case of attachment anxiety) and indirectly (in the case of attachment avoidance, through anger suppression) (Critchfield et al., 2008; Mikulincer & Shaver, 2007). As hostility is thought to reflect a mistrust and suspicion of others (Buss & Warren, 2000), it is unsurprising that this construct correlated highly with attachment anxiety and attachment avoidance, both of which are characterised by apprehension about the reliability and availability of support figures (Mikulincer & Shaver, 2007). Furthermore, as the Aggression Questionnaire measures hostile aggression in terms of negative expectations and beliefs about others, it is possible that these high levels of hostility are representative of the negative internal working model of others ingrained in those who are insecurely attached (Muris et al., 2004). This relationship between insecure attachment and hostility is consistent with previous research in both subclinical (Meesters & Muris, 2002; Mikulincer, 1998; Muris, Meesters, Morren & Moorman, 2004; Pederson, 1999) and clinical populations (Critchfield, Levy, Clarkin & Kernberg, 2008).

Both attachment dimensions were also significantly related to physical aggression at a univariate level, an association which has received substantially less empirical attention. This relationship has almost exclusively been considered in the intimate partner violence (IPV) literature, in which insecure attachment in general has been linked with physical and psychological abuse in intimate relationships

(Gormley, 2005; Mauricio & Gormley, 2001; Mauricio, Tein, & Lopez, 2007; Schumacher, Slep, & Heyman, 2001), with some studies suggesting that said link is stronger for attachment anxiety (Dutton et al., 1994; Roberts & Noller, 1998). In line with this, indirect effects analysis in the present study demonstrated that attachment anxiety alone had a significant indirect effect on physical aggression, through the under-regulation of anger and anger control. This suggests that, where attachment anxiety is concerned, the under-regulation of anger and poor anger control is associated with increased physical aggression. However, attachment avoidance was neither directly nor indirectly related to physical aggression.

Further, attachment-related differences were found in the regulatory processes that were implicated in hostility. In line with our predictions, attachment avoidance had an indirect relationship with hostility, through the use of anger suppression (supporting hypothesis 2.7). While the association between attachment avoidance and suppression has been well documented in previous studies concerning the regulation of negative emotions (Caldwell & Shaver, 2012; Mikulincer & Shaver, 2007), this study is the first to consider the mediating role of anger suppression in the relationship between attachment avoidance and hostility. The relationship between attachment anxiety and hostility was also mediated by anger control (in the negative direction), under-regulation and anger suppression, the latter of which was unexpected and somewhat surprising. Previous literature suggests that those high in attachment anxiety have a tendency to under-regulate negative emotions, often resulting in a flood of emotional expression (Gentzler,

Kerns & Keener, 2010). While the relevance of low anger control in the relationship between anxiety and hostility supports this theoretical stance, the finding that suppression is the strongest mediator of this relationship is both novel and intriguing. It suggests that while those high in attachment anxiety may under-regulate other negative emotions, they appear to implement a suppression strategy when dealing with anger specifically. This lends support to the proposition that attachment-related differences in emotion regulation are emotion-specific (Brenning & Braet, 2013; Goodall, 2015).

Prior evidence for a relationship between attachment insecurity and anger suppression has been somewhat conflicting, with some studies identifying an association between anger suppression and attachment avoidance alone (Calamari & Pini, 2003), some suggesting that both attachment anxiety and attachment avoidance are characterised by a tendency to suppress anger (Biernbaum, 1999), and some suggesting that attachment anxiety alone is associated with anger suppression (Mikulincer, 1998). Brenning and Braet (2013) conducted one of the first studies to consider the mediating role of specific anger regulation process, differentially associated with the adult attachment dimensions, in the association between attachment and negative outcomes (negative affect and interpersonal problems). Their findings were in contrast to those described here, as both attachment anxiety and attachment avoidance were related to anger dysregulation (akin to the under-regulation variable measured in this study). While this present study does not support the direction of their findings, our results do provide

evidence to suggest that attachment-related differences in emotion regulation may be emotion-specific, in that additional strategies (i.e. anger suppression) may also be used by those high in attachment anxiety in the context of anger (versus other discrete emotions, where mainly under-regulation is demonstrated; Wei, Vogel, Ku and Zakalik, 2005).

The theoretical underpinnings of the relationship between attachment and anger regulation can only be speculated on at this stage. However, as attachment-related differences in emotion regulation are goal-oriented (Gratz & Roemer, 2004), suppressing anger may serve a specific purpose for highly anxious individuals. Anger may be viewed as a problematic emotion, in that it could potentially reduce the likelihood of others offering support and hinder the maintenance of interpersonal relationships, therefore anger suppression may avoid alienating those around them (Rholes, Simpson, & Orina, 1999). While outward expression of some negative emotions such as distress may serve to elicit attention for those high in attachment anxiety, outward expression of anger may have the opposite effect, namely to drive others away. Thus, using suppression in the context of anger may be a more goal-congruent solution for these individuals, since their main objective is to deflect interpersonal closeness and alienate others (Fraley et al., 2000b).

In the case of both attachment avoidance and attachment anxiety, this use of suppression appears to lead to increased hostility. Thus for both dimensions,

suppressing the outward expression of anger does not stem hostile cognitions. This lends further support to prior literature, which suggests that suppression only serves to contain the outward expression of emotion, but does not effectively alter the negative cognitions associated with the emotion, and may instead increase feelings of bitterness and suspicion (Szasz et al., 2011).

Overall, these findings suggest that the relationship between anger variables and attachment may be mediated by maladaptive ways of regulating anger. While previous studies have identified an association between insecure attachment and aggression, these findings offer some insight into processes that underpin this relationship. The relationship between insecure attachment and hostility is not just a direct relationship. Rather, it is both partially mediated by anger suppression (for attachment avoidance and attachment anxiety), the under-regulation of anger and the reduced use of adaptive strategies such as controlling anger through relaxation and calming (for attachment anxiety alone). The under-regulation of anger, and a lack of adaptive anger control strategies, are also implicated in the indirect relationship between attachment anxiety and physical aggression.

As with all studies of a correlational nature, this study cannot infer causation. The current study also relied on self-report measures, which can be problematic in the context of suppression, as those high in suppression have a tendency to under-report symptoms (Schlatter & Cameron, 2010). Further, whether suppression is

conscious or subconscious is still a subject of debate within the literature (Koole & Rothermund, 2011). Future studies should include experimental anger manipulations and indirect aggression measures, potentially with physiological measures to determine whether individuals' self-reported anger regulation processes are commensurate with their physiological reactivity.

4.5 Conclusion Study 1b

While previous findings support the mediating role of emotion regulation in the link between attachment and a wide array of clinically relevant constructs, such as interpersonal difficulties and negative mood (Wei, Vogel, Ku & Zakalik, 2005), this is the first study to consider whether attachment-related differences in dispositional aggression are mediated differentially by specific anger expression tendencies. It provides preliminary evidence to suggest that the relationship between insecure attachment and hostility is mediated by the suppression and under-regulation of anger, and an inability to adaptively control one's angry feelings. While those high in attachment anxiety have been found to under-regulate other negative emotions, resulting in outward expression of those emotions, our results postulate that these individuals may additionally implement a suppression strategy, similar to that used more commonly by those high in attachment avoidance, when faced with the experience of anger. The mediation models indicate that anger suppression is implicated in the relationship between both attachment dimensions and hostility; but not in

the relationship between attachment anxiety and physical aggression. This supports the notion that suppression is a useful technique to reduce the external expression of anger, but is less useful at alleviating the internal experience of the emotion (John & Gross, 2004; Szasz et al., 2011). Further, these findings provide a novel and important addition to the current body of attachment and emotion regulation literature, and future studies should aim to further clarify this relationship.

In light of these findings, anger-management interventions may benefit from targeting the development of a flexible range of adaptive anger regulation strategies to reduce aggressive cognitions in those with high levels of attachment insecurity. Specifically, focus should be given to the development of techniques that aid in emotional acceptance and healthy emotional expression, while those high in attachment anxiety would further benefit from learning to use more adaptive control strategies to help them manage their anger and reduce dispositional levels of hostility and physical aggression.

Chapter 5. Study 2: Attachment-related reactivity and responsivity to an anger induction

5.1 Introduction Study 2

Study 2 was designed to allow for the more in-depth and implicit investigation of the relationships between attachment insecurity, anger and aggression. Specifically, this study examined the relationship between attachment insecurity, physiological responses to an anger induction procedure and subsequent aggressive behaviour.

Findings from Study 1a indicate that attachment anxiety is an independent predictor of self-reported trait anger, while attachment avoidance is not. As discussed in the previous chapter, this is in line with the majority of literature considering the attachment insecurity-anger link. As Study 1b revealed a significant relationship between attachment avoidance and anger suppression, the low self-reported trait anger in Study 1a could be seen to reflect this suppression technique in action. However, as discussed previously, suppression may not be an effective strategy in terms of alleviating the entire emotional experience; but rather serves only to diminish the external expression of anger (Dozier & Kobak, 1992). Indeed, a growing body of research suggests that, while those high in attachment avoidance report low levels of anger, they do in fact demonstrate physiological arousal commensurate with anger reactivity following provocation, using both an

experimenter harassment approach (discussed in more depth later in this chapter; Mikulincer, 1998), and an anger recall paradigm (Diamond et al., 2006; Dozier & Kobak, 1992). This is in line with former literature that also supports the proposition that both the under-regulation and suppression of emotion is associated with intensified physiological reactivity, as both approaches fail to contain or soothe the underlying experience of emotion (Gross, 1998; Gross & Levenson, 1997).

With this in mind, Study 2 of this thesis measured responses to an anger-induction procedure using both self-reported anger and physiological arousal to provide a more complete picture of attachment-related differences in anger expression. These measures are outlined in more depth within the methods section of this chapter. Overall, the findings of Studies 1a and 1b of this thesis, in combination with prior literature, suggest that attachment avoidance will be related to reduced changes in self-reported anger, but increased physiological arousal, from baseline to post-induction. On the other hand, the results of Study 1a, and prior literature, suggest that attachment anxiety will be significantly related to an increase in self-reported anger (i.e. anger change scores) from baseline to post-induction. Further, as Study 1b found attachment anxiety to be indirectly associated with physical aggression through the under-regulation of anger and poor anger control, it is expected that attachment anxiety will also be associated with an increase in physiological arousal from baseline to post-induction.

The expected association between both insecure attachment dimensions

and physiological reactivity to the anger induction procedure is further supported by research that demonstrates a relationship between hostility and increased heart rate and blood pressure following an anger inducing situation (Eckhardt & Deffenbacher, 1995; Fredrickson et al., 2000; Suarez & Williams, 1989). As Study 1b found that both attachment anxiety and attachment avoidance were indirectly associated with elevated levels of dispositional hostility, this further suggests that these constructs will also be associated with physiological reactivity following the anger-induction in Study 2.

The past few decades have seen the development of a wide range of techniques through which emotional responses can be induced or provoked in a laboratory setting. The most common method for emotion elicitation in experimental research is the use of emotive clips from movies or documentaries (Gross & Levenson, 1995). Philippot (1993) investigate the efficacy of emotional movie clips in eliciting specific emotions, as measured by a variety of self-reported emotion methods following the clips. In his sample of 60 Belgian students, high levels of congruence were found between the movie clips chosen to elicit sadness and amusement and participant self-reports of these emotions; however, no significant results were found for the clips reflecting anger, fear and disgust. Similar findings were demonstrated on a larger scale by Gross and Levenson (1995), who reviewed over 250 movie clips commonly used in emotion-induction research with 494 participants, with the aim of identify which clips provided the most salient results. While their participants did report experiencing anger following the anger-

inducing clips, this was often paired with an increase in disgust and sadness. This suggests that the clips used with an aim of inducing anger in lab-based paradigms often unveil a common blend of a variety of negative emotions including anger, sadness and disgust (Rottenberg et al., 2007).

This reflects the unique nature of anger as an emotional response, and has led to researchers suggesting that anger requires a higher level of personal engagement and involvement than many other emotions. Thus, methods that induce anger through interpersonal situations may prove more effective at eliciting high levels of anger (Gross & Levenson, 1995; Philippot, 1993; Rottenberg et al., 2007). For this reason, this research project used a high impact manipulation technique to induce anger through 'interpersonal insult'.

One common method of anger-induction that requires a high level of interpersonal involvement, briefly mentioned earlier in this chapter, is the 'experimenter harassment' task (e.g. Glynn, Christenfeld & Gerin, 2007). This type of procedure involved participants taking part in a complex arithmetic task (e.g. counting backwards from 2036 in sets of 13) which the experimenter interrupts them with negative and disparaging comments (e.g. 'Ok, I'm going to have to make this easier. Start again and try it in sevens'; 'If you don't speed up I'm not going to be able to use this data!'). This approach has been found to induce angry feelings and commensurate increases in physiological arousal (Glynn, Christenfeld & Gerin, 2002). However, as evidence consistently suggests that emotion suppression breaks down

under increased cognitive load (Mikulincer et al., 2000, 2004), the use of a cognitive task such as this was not deemed appropriate for the interests of this study. Therefore, a negative feedback paradigm was chosen for the present study, similar to that used by Harmon-Jones and Sigelman (2001) in their study of brain activation during anger and aggression (outlined later in this chapter). Previous research suggests that this type of negative feedback-based anger induction procedure increased levels of self-reported anger and blood pressure (Bushman & Baumeister, 1998; Bushman et al., 1999; Denson et al., 2010; Harmon-Jones & Sigelman, 2001; Memedovic et al., 2010), thus deeming it an appropriate measure to insight both self-reported and physiological anger-related responses in the present study.

However, due to the nature of this negative feedback-based anger induction paradigm, it is essential that this study takes sources of self-worth into account. As discussed previously, prior research suggests that attachment anxiety is associated with self-esteem fluctuations as a result of negative interpersonal feedback, seen to reflect the way in which they are viewed by others (i.e. self-liking), whereas attachment avoidance is related to fluctuations in light of positive agentic feedback, which reflects positive performance-related feedback (i.e. self-competence) (Hepper & Carnelley, 2011). This study also found that both attachment dimensions demonstrated self-esteem variability when faced with rejection-related interpersonal feedback. Therefore, in order to increase the likelihood that the negative feedback in the anger-induction task would elicit anger in both those high in attachment anxiety and those high in attachment avoidance, both interpersonal

and agentic feedback were included in the procedure. In other words, participants were given feedback on their marker's perception of them as a person (e.g. friendly) and on how they performed in the task (e.g. intelligent). Additionally, the SLSC-R (Tafarodi & Swann, 1995), previously used in Study 1a, was also administered so that the interaction between the attachment dimensions and both aspects of self-esteem (self-liking and self-competence) could be assessed.

Further results from Study 1b suggest that the difficulties in regulating and controlling anger displayed by those high in attachment anxiety may lead to an increase in physically aggressive behaviour. However, attachment avoidance was neither directly nor indirectly associated with physical aggression. Prior research has provided an inconsistent picture of the relationship between insecure attachment and aggressive behaviour, with evidence implicating both attachment anxiety and attachment avoidance in domestic violence (Bartholomew & Allison, 2006; Mikulincer, 2007) and antisocial behaviour (Moretti & Obsuth, 2009). Therefore, the results of Study 1b suggest that attachment anxiety may be an independent risk factor for physically aggressive behaviour, while attachment avoidance is less likely to be associated with such behaviour.

However, the use of self-report measures to infer aggressive behaviour can be problematic. As Vigil-Colet and colleagues point out, the social perception of a characteristic such as aggression is largely negative and thus is likely to be associated with social desirability effects (Vigil-Colet, Ruiz-Pamies, Anguiano-

Carrasco and Lorenzo-Seva, 2012). Indeed, prior studies have indicated that self-report measures of aggression, including the Buss-Perry Aggression Questionnaire used in Study 1b, are strongly associated with social desirability (Harris, 1997; Vigil-Colet et al., 2012). While this does not discredit the results of Study 1b, as a high volume of literature supports a strong relationship between self-reported aggression and actual aggressive behaviour (Williams, Boyd, Cascardi & Poythress, 1996), it does suggest that measuring aggressive behaviour indirectly may be a more effective, ecologically valid, approach for gauging actually aggressive tendencies.

Further, theoretically speaking, as attachment avoidance is associated with a desire to appear emotionally disinvested (Mikulincer & Shaver, 2003; Pietromonaco et al., 2006), it is possible that this dimension may be associated with a lower likelihood of reporting aggressive behaviour. As mentioned previously, aggressive responses may be seen to indicate emotional investment. However, using a more indirect, ecologically valid measure of aggressive behaviour may afford the possibility of capturing more automatic responses to the anger induction procedure, which may be less effected by their wish to exude a disinvested façade.

Two of the most popular lab-based methods for measuring physically aggressive behaviour are Buss's (1961) teacher-learner paradigm and Taylor's (1967) competitive reaction time task. The former involves the participant being told that their goal is to let a fictional other participant know when they perform poorly on a task by administering small electric shocks. In this paradigm, aggression is

operationalised as the mean level of intensity of the shock given by the participant following each error (Buss, 1961). However, the construct validity of this method has been questioned. Some researchers suggest that the administration of shocks in this task may be in some way altruistic, as participants use the shocks to aid the learning of the fictional other participants, despite the discomfort associated with the administration of the shocks (Taylor et al., 1976). It could also be suggested that this method is in fact a measure of compliance, due to its overlaps with Milgram's obedience measure. Although, it should be noted that, within Buss' procedure, participants have control over the intensity of the shocks given (Korn, 1997). However, they are still instructed to use the shocks when errors are made, and such this could still reflect a compliance with these rules rather than actual aggressive behaviour.

In response to these criticisms, Taylor (1967) amended Buss's aggression paradigm to involve the inclusion of competition and retaliation from the fictional other participant; in other words, creating an arguably more relevant context for aggression to arise. The Taylor Aggression Paradigm (TAP) is set up to give the impression of a competitive reaction time task, in which participants have the opportunity to administer small shocks to the fictional other participants when they lose a trial. Similarly, they also receive shocks from the fictional other participant when they lose trials. Giancola and Zeichner (1995) set out to evaluate the validity of the TAP, and found that the mean intensity of the electric shock given to the fictional other was significantly associated with dispositional measures of overt

aggression, including assaultive behaviour and verbal aggression. Further studies have offered additional support for the TAP as a behavioural measure of physical aggression, hostility, and the more general outward expression of anger (Giancola & Parrott, 2008; Hammock and Richardson, 1992). Generally, this research supports the use of the TAP to measure overt, outwardly expressed, aggressive behaviour in the present study. In their 2001 study on the reparative effects of aggression on angry mood, Bushman, Baumeister and Phillips substituted the mild electric shocks used in the original version of the TAP for a noxious noise blast, administered through headphones worn during the TAP task (Bushman et al., 2001) and found this to be a comparatively valid measure of overt aggression. Thus, the noise-blast version of this task was administered to reflect overt aggression in the present study using the same software developed for the study above, with personal permission from Brad Baumeister.

At present, very little research has considered attachment-related differences in aggression in the general population, which is crucial for the identification of risk factors for the development of actual aggressive behaviour. Identification of such factors will ensure that prevention (as well as intervention) efforts can be targeted before aggressive behaviour escalates to become a criminal problem, highlighting the societal importance of research such as this.

5.2 Pilot Study: Investigating the efficacy of a feedback-based interpersonal insult approach to an anger induction; impact on physiological arousal and self-report anger

Before the commencement of study 2, a pilot study was conducted to determine the extent to which the chosen anger induction task was effective in prompting changes in self-reported affect and physiological arousal conducive with anger reactivity. Firstly, the efficacy of the anger induction method was assessed using mean arterial blood pressure (MAP) and finger temperature (FT), which are deemed effective in identifying sympathetic activation of the cardiovascular system which has been linked to emotional reactivity in previous studies (i.e. increased MAP and reduced FT; Gross, 1998; Gross & Levenson, 1993, 1997; Richards & Gross, 1999). These methods were also selected for the final study. Secondly, the impact of a feedback-based laboratory anger induction on self-reported anger was considered, once again using the same self-reported anger measure intended for use in the final larger scale study. In order to achieve these aims, the following research objectives were developed.

1. To identify any changes in average MAP and FT levels from baseline to post-anger induction. Reactivity to the anger induction would be reflected by an elevation in MAP and a decrease in FT.

2. To identify any changes in self-reported anger levels from baseline to post-anger induction. If self-reported anger increased following the anger induction, this would suggest that the anger induction had been successful.

5.3 Methodology Pilot Study

5.3.1 Participants

Following ethical approval from Queen Margaret University's ethics panel (see Appendix 1b), participants were recruited internally through a research recruitment email distributed throughout the university. To ensure that reliable physiological data was collected, those currently taking medication with effects on the cardiovascular, respiratory, or central nervous system were unable to take part. Participants were also asked not to consume caffeine, nicotine or alcohol for two hours prior to the session to avoid interference with physiological results. The final sample consisted of 8 individuals (5 females and 2 males), with an average age of 36.6 years old ($SD = 15.2$); their age ranged from 20-60 years.

5.3.2 Procedure

This procedure took place in a psychology lab at Queen Margaret University over 40 minutes. Participants were told that the researchers were investigating the relationship between intelligence and well-being. Prior to the beginning of the

experiment, participants were seated at a desk and asked to read an information sheet which explained the cover story for the experiment (see Appendix 2b). They were also told that another participant was currently being tested in another room, with another experimenter, and that they would be performing collaboratively during the experiment. However, the other participant did not exist; the impression of another participant was included as part of the anger induction procedure (explained in more depth below).

After signing a consent form (see Appendix 3) to indicate that they understood the information sheet and still wanted to participate, finger temperature thermometers and a blood pressure cuff were applied to the participant (more information on these measures is provided below). Participants were told that physiological readings would be taken throughout the session to reflect their general physiological well-being, to maintain the cover story above. Firstly, participants were asked to close their eyes, relax and remain still for four minutes (timed by the experimenter) so that baseline physiological data could be obtained. Following the four-minute rest period, three readings were taken for each physiological marker (i.e. index and middle finger temperature, and diastolic and systolic blood pressure), which were then averaged to obtain mean baseline physiological values. While the finger temperature thermometers were left on throughout the session, the blood pressure cuff was removed and reapplied as required to allow participants to write comfortably during the testing session. Self-report affect ratings were then taken using a questionnaire (described below) to

reflect baseline anger, introduced as a measure of emotional well-being. Participants were then asked to provide demographic information including age, gender, nationality and student status. The anger induction task then took place.

Anger Induction Task: As mentioned previously, a high impact manipulation technique was used to induce anger through ‘interpersonal insult’, similar to that used by Harmon-Jones and Sigelman (2001) in their study of brain activation during anger and aggression. Participants were lead to believe that this was the first measure of intelligence. This method involved participants being asked to write a short essay in which they were required to argue their views on a current issue. Participants were given the choice of three essay topics: Should assisted suicide be legal?; Can people be born evil?; and Should Scotland have gone independent? (see participant instructions in Appendix 6). Participants were informed that their writing would be evaluated by another participant. As mentioned earlier, there was no other participant (herein referred to as the ‘fictional other’). Having chosen the topic they would like to write above, participants were given 10 minutes (timed by the experimenter) to write their essay. The experimenter let the participant know when they were halfway through their allotted time, and when they had one minute left to wrap up their argument. Once the participant completed their essay, the experimenter moved to a nearby room so that participants would assume they were swapping essays with the other experimenter. At this stage, participants were given a fake essay on the topic of ‘Should the death penalty be reinstated in the UK?’, in gender-matched handwriting, as suggested by Harmon-Jones and Sigelman (2001),

to provide feedback on.

Participants were provided with a feedback form to complete, which required them to rate the fictional other's essay using 9-point ratings on six specific scales (i.e. 1=unintelligent → 9=intelligent; 1=boring→ 9=thought-provoking; 1=unfriendly → 9=friendly; 1=illogical → 9=logical; 1=disreputable → 9=respectable; 1=irrational → 9=rational). The feedback sheet also included an 'Additional Comments' box, where the participant could provide some qualitative comments on the essay. This essay was strongly biased with a poorly constructed argument, purposefully written this way by a university level tutor, so as to increase the likelihood of participants feeling as though the negative feedback they received (which they believed came from the author of that essay) was unjustified. Again, once the participant indicated that they had completed the essay feedback form, the experimenter moved to a nearby room to swap their feedback form for that supposedly completed by the fictional other.

Upon the experimenter's return, participants were then handed an envelope containing pre-written negative feedback on their essay from the fictional other, with low scores (ranging from 1 to 3) on all of the rating scales listed above. The feedback also included a further negative statement in the 'Additional Comments' box (i.e. "I can't believe an educated person would think like this. I hope this person learns something at QMU!"). Participants were told that the experimenter was not allowed to see what ratings had been given on the feedback sheet, but that they

were welcome to take a brief look and asked to place the feedback back in the envelope once they had done so, so that the procedure could continue. A typed example of the feedback that participants received is provided in Appendix 7 (although it was handwritten in the experiment). Post-induction affect ratings were then taken and BP and FT were recorded three times each in the two minutes following the anger induction. BP and FT averages across this two-minute period provided mean post-induction values.

Finally, participants were asked to apply a set of headphones provided and watch a short comedy clip to induce positive affect (McIntyre, 2013; 'Live and Laughing on Accents'). This is in line with section 8 of the British Psychological Society's Code of Human Research Ethics, which suggests that any negative mood induction procedure should be followed by the induction of a happy mood state before the research session is concluded (BPS, 2010). Participants were then thanked for taking part and debriefed by the experimenter (see Appendix 4b). At this stage, participants were provided with the experimenter's contact details, should they have any further questions following their participation, and information on support for dealing with anger(www.mind.org.uk/information-support/types-of-mental-health-problems/anger).

5.3.3 Measures

i) Anger Expression: Self-Reported Affect Scale

To measure self-reported affect, participants were asked to indicate the extent to which they felt a variety of emotions on a scale of 0-5 (not at all – extremely). This scale contained twenty-four items and ratings were collected on scales reflecting anger (angry, annoyed, bad, hostile, irritable, frustrated, agitated), fear (jittery, scared, afraid, nervous), and positive affect (good mood, strong, excited, attentive, uplifted, happy, inspired, determined, active, interested, alert, enthusiastic, proud). Participants were asked to indicate the extent to which they felt each emotion at the two stages mentioned above (Baseline and post-induction). Analysis focused on the scores collected for the anger subscale, with the other terms acting as distracters to avoid participant suspicion. This scale was previously used by Harmon-Jones and Sigelman (2001), whose study implemented the same anger induction procedure described above. In their study, the internal consistency of the anger scale was $\alpha = .91$. Similarly, the present pilot study demonstrated an internal consistency score of $\alpha = .84$ (anger).

ii) Anger Experience: Physiological change; MAP and FT

This study used both mean arterial pressure (MAP; the average pressure in one's arteries during one cardiac cycle) and participant finger temperature (FT) to measure physiological reactivity to anger induction. A formula was used to calculate

mean arterial pressure (MAP) from systolic blood pressure (SBP; the highest pressure in your vessels when your heart is contracted) and diastolic blood pressure (DBP; the highest pressure when your heart is at rest); $SBP + (DBP \times 2) / 3 = MAP$ (Sinha, Lovallo & Parsons, 1992). Previous research indicates that these two methods are effective in identifying sympathetic activation of the cardiovascular system, and changes in both have been linked to emotional reactivity (i.e. increased BP and reduced FT; Gross, 1998; Gross & Levenson, 1993, 1997; Mauss, Cook & Gross, 2007; Richards & Gross, 1999). BP was measured using an Omron M5-I Digital Automatic Blood Pressure Monitor, placed on the participant's dominant arm, and FT was measured using a Testoterm 1100 Thermometer, which was placed on the index finger and middle finger of the participant's non-dominant hand. The FT scores from the participant's index and middle finger were combined and averaged at each measurement point to provide a mean FT score for both baseline and post-anger induction. As mentioned above, while the FT sensors were left on for the duration of the session, the blood pressure monitor was applied as and when needed so as to avoid restricting movement during the anger induction and the reaction time task. Pre-induction physiology scores were compared with post-induction scores to determine physiological change.

5.4 Results Pilot Study

5.4.1 Paired samples *t*-tests

Paired samples *t*-tests were conducted to confirm the efficacy of the anger induction procedure. As can be seen in Figures 6, 7 and 8, all physiological measures, and self-reported affect, changed significantly in the expected directions following the anger induction. That is, self-reported anger increased significantly; $t(6) = -3.991$, two-tailed $p = .007$), as did mean arterial blood pressure; $t(6) = -2.949$, two-tailed $p = .026$, while finger temperature decreased; $t(6) = 2.601$, two-tailed $p = .041$. This confirms that the procedure had the desired impact on participant state, and thus it was deemed suitable for use in study three with a larger participant sample.

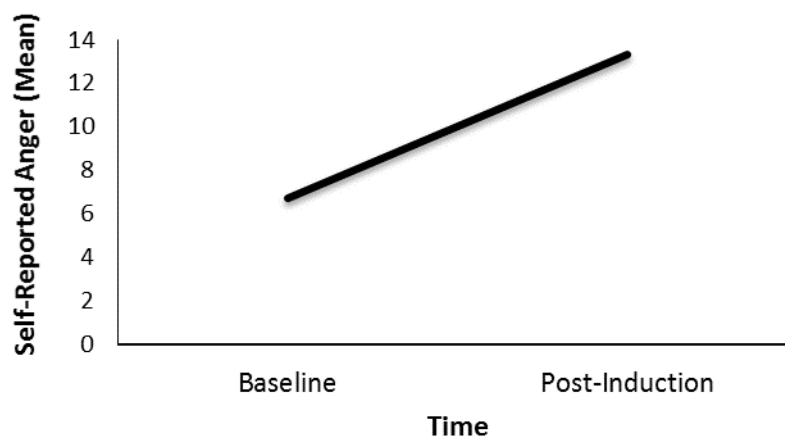


Figure 7. Changes in self-reported anger scores from baseline to post-induction (Pilot)

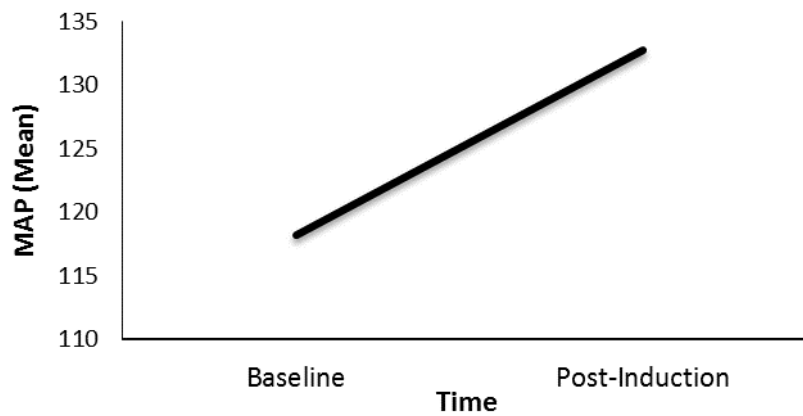


Figure 8. Changes in Mean Arterial Pressure (MAP) from baseline to post-induction (Pilot)

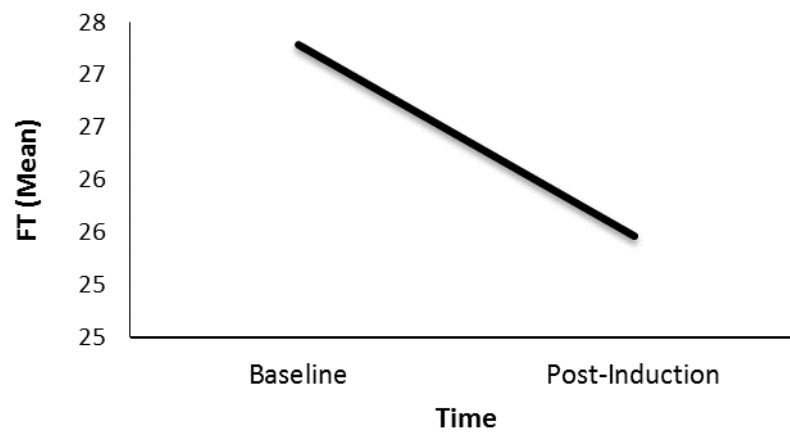


Figure 9. Changes in finger temperature (FT) from baseline to post-induction (Pilot)

5.5 Conclusion Pilot Study

In line with previous studies (Bushman & Baumeister, 1998; Bushman et al., 1999; Denson et al., 2010; Harmon-Jones & Sigelman, 2001; Memedovic et al., 2010), the

pilot study demonstrated that the feedback-based interpersonal insult paradigm was a sufficient method of anger provocation to induce a significant increase in physiological arousal, demonstrating a significant increase in mean arterial blood pressure and a significant decrease in finger temperature from baseline to post-induction. As predicted, a significant increase was also found in self-reports of anger, overall deeming this paradigm successful and justifying its application in Study 2 of this thesis.

5.6 Study 2: Attachment-related reactivity and responsivity to an anger induction

As the results from the pilot study indicated that the negative feedback-based anger induction procedure was successful in eliciting changes in self-reported anger and physiological arousal, it was considered suitable for inducing anger in Study 2. Based on the results of Studies 1a and 1b, and findings from previous literature, as discussed earlier in this chapter, the following hypotheses were developed prior to the commencement of Study 2.

Hypothesis 3.1: Attachment anxiety will be associated with increased self-reported anger levels from baseline to post- induction

Hypothesis 3.2: Attachment avoidance will be associated with decreased self-reported anger from baseline to post-induction

Hypothesis 3.3: Attachment anxiety will be associated with increased physiological reactivity following the anger induction procedure

Hypothesis 3.4: Attachment avoidance will be associated with increased physiological reactivity following the anger induction procedure

Hypothesis 3.5: Attachment avoidance will predict the use of suppression following the anger induction procedure

Hypothesis 3.6: Attachment anxiety will predict higher levels of aggression

5.7 Method Study 2

5.7.1 Participants

Following ethical approval from Queen Margaret University's ethics panel (see Appendix 1c), participants were recruited internally through a research recruitment email distributed throughout the university, and the Research Participation Scheme in which second year undergraduate Psychology students are required to take part in internal research projects to achieve course credit. To ensure that reliable physiological data was collected, those currently taking medication with effects on the cardiovascular, respiratory, or central nervous system were unable to take part. As in the pilot study, participants were asked not to consume caffeine, nicotine or alcohol for two hours prior to the session to avoid interference with physiological results. As part of the procedure required participants to identify a change in stimulus colour (the aggression task), colour blindness was an exclusion criterion for the study. The final sample consisted of 78 individuals (63 females and 15 males). This sample size was in line with a power analysis, conducted using G* Power 3.1, which suggested a sample of 77 participants was required to achieve 80% power in detecting a medium effect size in the regression (based on an alpha of .05). This power analysis was based on the 2 predictors hypothesised for the upcoming regression models (attachment anxiety and attachment avoidance). As outlined in studies 1a and 1b, a medium effect size was expected given the literature showing a range of small to medium effects in the relationship between attachment and

emotion/emotion regulation related variables across a range of domains (e.g. Cooper & Shaver, 1998; David, Shaver & Vernon, 2003; Kafetsios, 2004; Meredith, Strong & Feeney, 2006; Trub & Starks, 2017). The sample was comprised of 89.6% currently registered students, with an average age of 26.2 years old ($SD = 10.5$); their age ranged from 18-60 years. Participants were also asked whether English was their first language; 66.2% identified that it was, while 33.8% said that it was not.

5.7.2 Procedure

This procedure took place in the same psychology lab as the pilot study over a one-hour period. Participants were firstly provided with an information sheet outlining what would be involved should they choose to take part (see Appendix 2c). In this information sheet, participants were told that the researchers were investigating the relationship between intelligence, personality and physiological well-being. After consent was confirmed (see Appendix 3), initially the procedure matched that of the pilot study, with the addition of a research assistant, who knocked on the testing room door within the five minutes following the participant's arrival to tell the experimenter that the other participant was now ready to begin. This was done to increase the likelihood that the participant would believe that there was another participant taking part in the study.

In addition to the procedure described above, participants also completed

measures of attachment (ECR-R; Fraley et al., 2000b) and self-esteem (SLSC-R; Tafari & Swann, 1995), as in Studies 1a and 1b, disguised as personality measures, directly after rating their baseline levels of affect and were asked to provide demographic information including age, gender, nationality and student status. The anger induction task then took place (outlined above). Following the anger induction procedure, participants took part in the competitive reaction time task (introduced as an additional intelligence measure) to assess their levels of aggression following the anger induction.

Competitive Reaction Time Task: Aggression as a result of induced anger was measured using a modified version of the Taylor Aggression Paradigm (TAP; Taylor, 1967), run using the Competitive Reaction Time software developed by Brad Bushman and Scott J Saults (Bushman & Baumeister, 1998) on a laptop computer. This involved a 25-trial competitive reaction time game in which participants were led to believe that they were competing against the fictional other. The game required participants to react to an on-screen stimulus change, and the slowest responder received a blast of white noise.

Participants were asked to select the intensity and duration of the noise blast to be received by the fictional other if they were to lose a trial, on scales from one to ten. This was done by dragging an on-screen slider to the desired level and releasing the mouse button (see Appendix 8 for TAP screenshot). Intensity levels ranged from 60dB to 105dB, increasing by 5dB at each level, and the duration levels

ranged from 500ms to 5000ms. As a reference point, 105dB is just marginally lower than the average human pain threshold (110dB), which is equal to the sound of a turbo-fan aircraft taking off at 200ft (IAC Acoustics, 2016). Participants were firstly asked to read an instruction sheet for this task, after which the experimenter ran through the instructions a second time to ensure that it was clear before the game began. Participants were then asked to place the over-ear headphones on, which they wore for the duration of the task, and the experimenter demonstrated the intensity of the noise blasts that they would have the option of administering to the fictional other at levels one, five and ten (for 1000ms each). The experimenter then ostensibly went to check that the fictional other was ready to begin, to maintain the participant's belief that there was another person taking part.

Participants were then asked to click 'continue' when they were ready to begin, at which point a rigged loading bar appeared on the screen for 6 seconds, indicating that the computer system was waiting to receive a connection from the other player. The participant was then asked to set their first duration and intensity levels for the fictional other, at which point the experimenter moved to the opposite side of the room so that this could be done privately. During each trial, the participants were instructed to pay attention to a green box in the middle of a grey screen. They were told that this box would turn yellow once both players had set their desired noise levels, to let each participant know that the trial had begun. The participant then had to click the box with the mouse cursor as quickly as possible when it turned from yellow to red. They were told that their goal was to react to this

colour change faster than the other participant. Participants were given the opportunity to amend their noise level selections before every trial. Aggressive reaction was operationalised as the mean of the duration and intensity of the initial noise blast given on trial 1 (i.e. trial 1 duration + trial 1 intensity/2). This computerised task was rigged so that participants randomly won and lost half of the 25 trials they took part in. While only the data from the first trial was used to measure aggressive reaction, the remaining 24 trials were kept in to give the impression that this was a reaction time task. Research supports that this is a valid measure of physical aggression (Anderson & Bushman, 1997; Giancola & Chermack, 1996; Giancola & Zeichner, 1995). Following the final trial, a screen appeared to let the participant know that the game was over, and to alert the experimenter that they were ready to proceed.

Following the aggression task, participants were asked to reapply the headphones provided and watched the short comedy clip used in the pilot study to induce positive affect as recommended by the British Psychological Society's Code of Human Research Ethics (BPS, 2010). The clip used in this study was Michael McIntyre's 'Live and Laughing; Accents' (McIntyre, 2013). Following this, a post-experiment interview was conducted to ensure understanding of instructions and to probe for suspicion of the manipulation. Participants were then thanked for taking part and debriefed verbally, by the experimenter. As in the pilot study, participants were then debriefed (see Appendix 4c) and provided with the experimenter's contact details, should they have any further questions following their participation,

and information on support for dealing with anger (www.mind.org.uk/information-support/types-of-mental-health-problems/anger).

5.7.3 Measures

(i) Adult Attachment: Experiences in Close Relationships Revised scale (ECR-R; Fraley et al., 2000b)

As outlined in Studies 1a and 1b, the ECR-R is a 36-item self-report tool that measures adult attachment using two subscales: attachment anxiety (e.g. I often worry that my partner will not want to stay with me) and attachment avoidance (e.g. I prefer not to be too close to romantic partners) (Brennan et al., 1998). In the present study, the attachment anxiety and attachment avoidance subscales demonstrated alpha coefficients of $\alpha = .91$ and $\alpha = .94$, respectively, suggesting good internal consistency.

ii) Self-Esteem: The Self-Liking/Self-Competence Scale Revised (SLSC-R; Tafarodi & Swann, 1995)

As outlined in Study 1a, the SLSC-R is a 16-item questionnaire that measures self-esteem along two dimensional subscales: self-competence (e.g. I am highly effective

at things I do) and self-liking (e.g. I feel great about who I am). Cronbach's alpha coefficients for the SLSC-R in the present study were $\alpha = .87$ for self-liking and $\alpha = .75$ for self-competence, suggesting acceptable internal consistency.

iii) Anger Expression: Self-Reported Affect Scale

The affect scale used in the pilot study was also administered in this study. In the present study, the alpha coefficient for baseline self-reported anger was $\alpha = .82$, while the post-induction coefficient $\alpha = .89$.

iv) Anger Experience: Physiological Change: MAP and FT

As outlined in the Pilot Study, this study used both mean arterial pressure (MAP; the average pressure in one's arteries during one cardiac cycle) and participant finger temperature (FT) to measure physiological reactivity to anger induction.

v) Anger Suppression

Anger suppression was reflected by a discrepancy between an individual's physiological and self-report scores (i.e. low self-reported anger, but increased physiological arousal). Therefore, an anger suppression index was created by computing the difference between post-induction self-report anger scores and post-induction finger temperature (FT) scores (self-report - physiological scores; i.e.

expression - experience). Lower scores on this suppression index reflect higher levels of anger suppression. This follows the same procedure used by Dworkin (2015) to create an emotion suppression index to reflect a discrepancy between emotional experience and expression, where emotional experience was present in the absence of emotional expression. While Dworkin (2015) was interested in self-reported emotion versus behavioural indicators of experience, this present study is using physiological variables to reflect emotional (i.e. anger) experience. The creation of this variable is supported by the abundance of research that suggests that emotion suppression is reflected by a discrepancy between self-reported expressions of emotion and physiological responding in that emotion, where self-report is considerably lower than the physiological arousal experience by the individual (Dozier & Kobak, 1992; Richards & Gross, 1999; Szasz et al., 2011). This suggests that suppressing the outward expression of emotions results in a somewhat 'ironic processing effect', where the physiological experience of the emotion is exacerbated. Further, the inclusion of this variable will allow the researcher to identify whether avoidance-related anger suppression can also be identified in an anger-induction scenario, providing additional insight into the self-reported dispositional links uncovered in Study 1b.

vi) Suspicion of manipulation

A post-induction interview was conducted to determine whether any participants were suspicious of the manipulation (i.e. that there was no other participant). As a

large proportion of the participants used in this study were Psychology undergraduates, who are arguably more inclined to be suspicious of research aims (as discussed in more depth in Chapter 6 of this thesis), a manipulation check was included. While some level of participant suspicion does not necessarily impact on study outcomes, when suspicion itself is not probed for it can jeopardise the accurate testing of hypotheses, as it may lead to abnormal or non-characteristic responding (Taylor & Shepperd, 1996). In the current experiment, it could be expected that if participants do not believe that the negative feedback was genuine, they would be less affected. Thus, in line with the manipulation probe used in a similar anger induction study by Harmon-Jones and Sigelman (2001), participants were asked the following questions before being debriefed:

1. How did you feel when you were writing your essay?
2. Did you feel you had adequate time to get your point across?
3. Did anything seem odd or unusual?
4. Based on the tasks you have taken part in, can you think of something else that we might be interested in other than what I told you to begin with? a) If so, what? b) Why did you think this? c) Do you feel it affected your performance at any stage?

Participants were told that these questions were being asked to gain insight into their experience during the essay writing task, so that any issues could be noted. Questions 1 and 2 were distracter questions; questions 3 and 4 were used to determine whether there was any suspicion that the 'other participant' was fictional,

as this could have impacted on their performance on the two main tasks and thus confounded the results. It is important to note that Aronson, Wilson and Brewer (1998) suggest that questions of this nature act as a 'giveaway' for participants following the experiment, and thus they are often likely to indicate suspicion whether or not it exists, or may possibly only become suspicious at this point and begin considering possible alternative study variables post-hoc. For this reason, they suggest it is important to clarify the nature of the suspicion, and to further explore whether or not an indication of suspicion impacted on the outcomes of the statistical analysis. In line with this, participant responses to question 4 were coded to identify participants who were (1) suspicious that there was no other participant (2) suspicious that other variables were being measured, and (3) not suspicious at all. This allowed for the upcoming analysis to be explored excluding all suspicious participants (1 and 2), and only those suspicious of no other participant (1), to determine whether this significantly influenced the outcomes. The inclusion of this control measure was considered essential in order to protect in integrity of this study and its subsequent findings. The outcome of analyses with suspicious participants excluded did not differ from those where all participants were included. These findings are discussed in the results section of this chapter, and presented in Appendix 9.

5.7.4 Analytical strategy

The data for this study were analysed using SPSS 21. Firstly, data screening took place, to identify any outliers and determine the distribution of the data (outlined below). Then descriptive statistics and correlations were conducted to investigate the univariate relationships between main study variables. This analysis was used to determine whether the attachment dimensions were significantly associated with self-reported anger change and physiological change following the anger induction (addressing hypotheses 3.1, 3.2, 3.3 and 3.4). Two regression models were then developed to determine whether attachment dimensions predicted the use of anger suppression (hypothesis 3.5) and variance in aggression scores (hypothesis 3.6). Further, these regression models were also computed with the exclusion of suspicious participants, to determine the impact of participant suspicion on the results.

5.8 Results Study 2

5.8.1 Data screening

As in Studies 1a and 1b, Z-scores were calculated for all variables measured using SPSS to determine whether any variable scores fell in excess of ± 3.29 (Tabachnick and Fidell, 2007). However, no outliers were identified and thus the full sample ($n=78$) was used in analysis. Once again, skewness statistics were used to determine whether data for each variable were normally distributed. Variable scores are considered to be normally distributed if the skewness statistic falls within the range

of \pm twice the Std. Error of Skewness. As the Std. Error of Skewness for this data was reported in the descriptive analyses as .274, the normal range was -.548 to +.548. In line with this range, all variables were normally distributed except aggression (1.161), baseline anger (2.545), baseline MAP (.739) and post-induction MAP (1.227); all of which demonstrated a positive skew. Independent samples t-tests were conducted to determine whether there was any significant impact of suspicion of manipulation, as indicated in the post-experiment interview. Participant responses to the question 'Based on the tasks you've taken part in, is there anything you think we might be interested in other than what we told you to begin with? If so, what?' to reflect those who were suspicious that there was no other participant (1), those who were suspicious that we may be measuring other variables (e.g. competitiveness, response to provoking noise blast; 2) and those who were not suspicious at all (3). The t-test shown in Table 8 compared those who were suspicious (i.e. coded as 1 or 2) with those who were not suspicious (i.e. coded as 3) on self-reported anger change, physiological change scores, anger suppression and aggression variables. As demonstrated in Table 8, the only significant difference between suspicious and non-suspicious participants was identified for the aggression variable, with non-suspicious participants scoring significantly higher on this construct.

Table 8. Independent samples t-test comparing mean scores on the main study variables by suspicion of manipulation

	Suspicious			Not Suspicious			95% CI for Mean Difference	t	df
	M	SD	n	M	SD	N			
Self-Report Anger Change	5.87	5.78	23	6.28	5.78	55	-3.02, 2.21	-0.311	76
MAP Change	6.02	7.18	23	4.85	6.77	55	-2.25, 4.59	0.681	76
FT Change	-1.61	3.12	23	-2.96	3.04	55	-1.66, 2.87	0.601	76
Aggression	2.52	1.86	23	3.57	2.19	55	-2.09, -0.01	-2.012	76
Anger Suppression	-13.61	5.43	23	-12.12	6.57	55	-4.70, 1.71	-0.930	76

5.8.2 Descriptive statistics and correlations

Descriptive statistics and correlations for the main study variables are displayed in Table 9. Cohen's (1988) standards for Pearson's correlation coefficient effect size were used to determine the strength of the effects (i.e. small, $r = .10$; medium, $r = .30$; large, $r = .50$). Independent samples t-tests were used to examine gender differences for all main study variables, but no significant gender differences were identified. Age was positively correlated with mean arterial pressure (MAP) at both baseline ($r = .45$, $p < .001$; large effect) and post-induction ($r = .53$, $p < .001$; large effect), and with finger temperature (FT) at post-induction ($r = .24$, $p = .034$; small to medium effect). This suggests that MAP increases with age regardless of the anger induction, while age is positively associated with FT only following the anger induction. However, age was not significantly related to any of the physiological change scores, suggesting that age was not related to reactivity to the anger induction procedure.

Paired samples t-tests were also conducted to confirm the efficacy of the anger induction procedure. All physiological measures, and self-reported affect, changed significantly in the expected directions following the anger induction. That is, self-reported anger increased significantly (see Figure 9), as did mean arterial blood pressure (see Figure 10), while finger temperature decreased (see Figure 11). This confirms that the procedure had the desired impact on participant state.

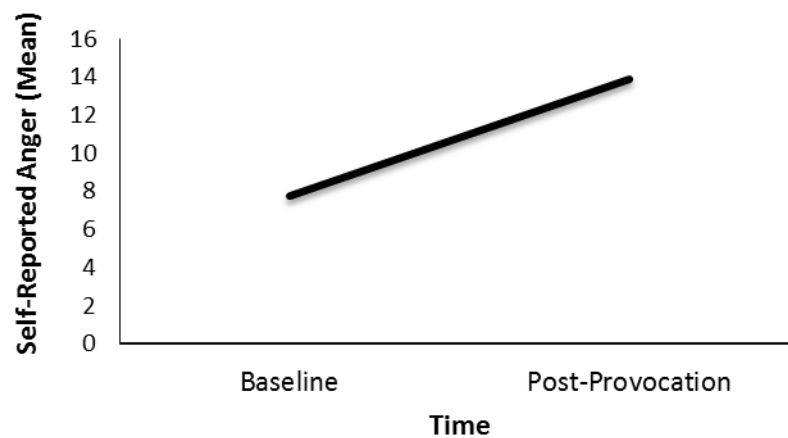


Figure 10. Changes in self-reported anger scores from baseline to post-induction

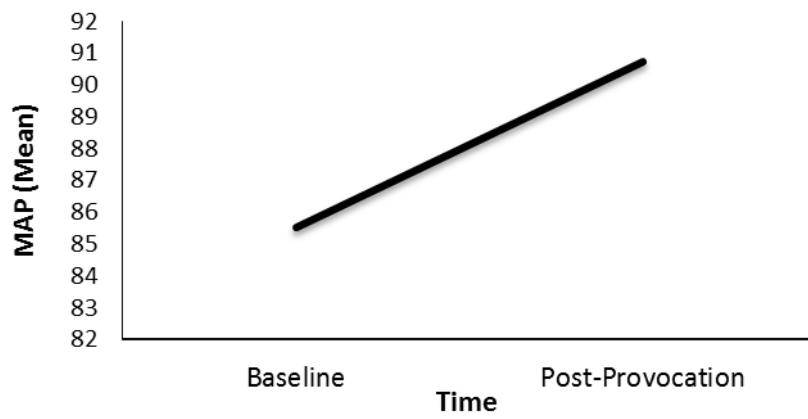


Figure 11. Changes in Mean Arterial Pressure (MAP) from baseline to post-induction

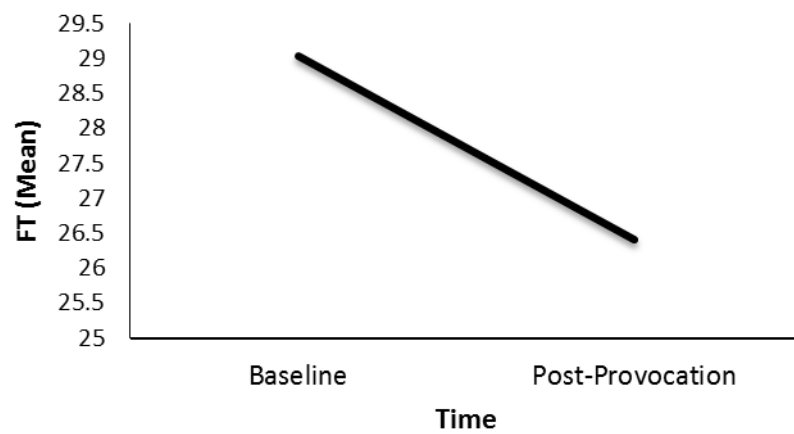


Figure 12. Changes in finger temperature (FT) from baseline to post-induction

Measure inter-correlations, internal consistency and norms

The attachment anxiety and attachment avoidance subscales of the ECR-R had a

significant positive relationship with one another ($r = .32, p = .005$; medium effect). As mentioned under Studies 1a and 1b, this is closely in line with the expected inter-correlation between the attachment dimensions (Fraley, 2012). Cronbach's alpha coefficients were as follows: attachment anxiety ($\alpha = .91$); attachment avoidance ($\alpha = .94$), suggesting strong internal consistency. As can be seen in Table 9 the ECR-R had means of 2.71 ($SD = 1.00$; attachment anxiety) and 3.26 ($SD = 1.14$; attachment avoidance). While the average score for attachment anxiety, based on Fraley and Shaver's 2012 study, is lower than expected ($m = 3.56, SD = 1.12$), the average score for attachment avoidance is higher ($m = 2.92, SD = 1.19$).

The self-liking and self-competence subscales of the SLSC were positively correlated with one another ($r = .57, p < .001$; large effect). This was in line with the anticipated correlation between these two dimensions based on previous validations of the instrument ($r = .69$; Tafari & Swann, 1995). Cronbach's alpha coefficients for the SLSC were $\alpha = .87$ for self-liking and $\alpha = .75$ for self-competence, once again suggesting high internal consistency. Tafari & Swann (1995) found average self-liking scores of 37.19 ($SD = 8.35$) for females and 38.36 ($SD = 7.90$) for males; and self-competence averages of 41.86 ($SD = 6.58$) for females, and 42.54 ($SD = 6.35$) for males. In the present study, the average for self-liking was 24.30 ($SD = 6.44$) and the average for self-competence was 24.82 ($SD = 4.40$), indicating substantially lower levels of both facets of self-esteem in the current sample. Overall, this suggests that the present sample were somewhat lower than average on attachment anxiety, but higher in attachment avoidance, and lower in self-esteem

than previous general population samples. However, it should be noted that no statistical tests were carried out to determine significant differences between this sample and previous population samples, and so this can only be considered at trend level.

Finally, Cronbach's alpha coefficients for the baseline anger self-report measure was $\alpha = .82$, while the post-induction anger scale demonstrated an alpha coefficient of $\alpha = .89$. Both of these figures demonstrate the strong internal consistency of this measure both pre- and post- induction.

5.8.3 The relationships between attachment dimensions and main study variables

Pearson's correlations demonstrated some significant associations between attachment insecurity and other main study variables, as shown in Table 9. Attachment anxiety demonstrated a significant negative relationship with self-liking ($r = -.39, p = .001$; medium to large effect) and self-competence ($r = -.24, p = .035$; small to medium effect), and significant positive relationships with baseline self-report anger ($r = .26, p = .025$; small to medium effect) and aggressive behaviour, as measured by the Taylor Aggression Paradigm ($r = .33, p = .003$; medium effect). These findings suggest that as attachment anxiety increases, dispositional self-liking and self-competence decrease, and self-report anger (at baseline) and aggression (following an anger induction) increases. There was no significant relationship

between attachment anxiety and anger suppression scores ($r = .11, p = .338$).

Attachment avoidance was negatively associated with both self-liking ($r = -.43, p < .001$; large effect) and self-competence ($r = -.29, p = .009$; medium effect). This suggests that lower levels of self-liking and self-competence are associated with higher attachment avoidance. Attachment avoidance was also negatively associated with post-induction self-report anger ($r = -.26, p = .022$; small to medium effect) and with anger suppression scores ($r = -.24, p = .034$; small to medium effect), suggesting that as attachment avoidance increases, self-reported anger (following an anger induction) decreases, while the use of suppression increases (as lower scores on the suppression measure indicate higher levels of suppression).

Partial correlations were conducted to identify the relationship between each attachment dimension and self-esteem variables, when controlling for the other (see Table 10). Whilst controlling for attachment anxiety, attachment avoidance remained significantly related to self-liking ($r = -.35, p = .002$; medium effect) and self-competence ($r = -.24, p = .040$; small to medium effect). On the other hand, when controlling for attachment avoidance, attachment anxiety remained significantly related to self-liking alone ($r = -.29, p = .011$; medium effect). This suggests that, independent of the other dimension, attachment anxiety is associated with lower self-liking, whereas attachment avoidance is related to decreased levels of both self-liking and self-competence.

Change scores were computed for self-report anger and for both MAP and FT, to identify how the main study variables (attachment dimensions, self-esteem subscales, aggression and suppression) were related to both self-reported anger and physiological reactivity to the anger induction. Self-report anger change scores were negatively associated with attachment avoidance ($r = -.32, p = .004$; medium effect), suggesting that attachment avoidance is associated with decreases in self-reported anger from pre- to post-test. Anger change was also positively related to anger suppression scores ($r = .73, p < .001$; large effect). This suggests that higher levels of suppression following the induction procedure were associated with reduced pre- to post-test changes in self-reported anger. Self-report anger change also demonstrated a significant negative relationship with FT change ($r = -.29, p = .011$; medium effect), suggesting that a higher increase in self-report anger from baseline to post-induction was associated with a greater reduction in finger temperature, as would be expected. No significant relationships were found between MAP change scores and any of the main study variables.

Table 9. Descriptive statistics and Pearson's correlations among main variables (n = 78).

		Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	1. Age	26.18	10.47	1	-.19	-.19	.7	.12	.25	.02	.45**	.19	.53**	.24*	-.01	.20	.05	-.15	-.12
ECR-R	2. Anxiety	2.81	1.00		1	.32**	-.39**	-.24*	.26	.10	-.10	-.03	-.01	-.04	-.04	.15	-.03	.11	.33**
	3. Avoidance	3.26	1.14			1	-.43**	-.29**	.13	-.26*	.01	-.07	-.04	.05	-.32**	-.09	.16	-.24*	.03
SLSC-R	4. Self-Liking	24.30	6.44				1	.57**	-.01	.05	-.04	.12	-.00	.04	.06	.05	-.15	.01	-.17
	5. Self-Competence	24.82	4.40					1	-.05	.16	.00	.13	-.01	.04	.19	-.03	-.13	.10	-.21
Self-Report Affect	6. Baseline Anger	7.73	2.85						1	.22	.09	-.16	.04	.04	-.33**	-.08	.29**	.15	.11
	7. Post-Induction Anger	13.88	5.06							1	.14	.18	.18	.11	.85**	.08	-.13	.73**	.16
Physiological Scores	8. Baseline MAP	85.52	11.40								1	.23*	.83**	.34**	.09	-.19	.08	-.12	-.16
	9. Baseline FT	29.02	4.91									1	.23*	.78**	.26*	.31	-.48**	-.39**	-.01
	10. Post-Induction MAP	90.71	12.19										1	.39**	.15	.39**	.02	-.12	-.16
	11. Post Induction FT	26.41	4.30											1	.08	.12	.16	-.60**	-.02
Change Scores (Baseline to post-induction)	12. Self-Report Anger Change	6.16	5.24												1	.13	-.29*	.63**	.09
	13. MAP Change	5.20	6.87													1	-.11	-.02	-.02
	14. FT Change	-2.56	3.11														1	-.22	-.03
	15. Anger Suppression	0.16	0.06															1	.14
	16. Aggression	3.26	2.14																1

*p<.05, **p<.001

Table 10. Partial correlations between attachment dimensions and self-esteem variables (controlling for each other)

	Self-liking	Self-competence
1. Anxiety (controlling for avoidance)	-.29*	-.16
2. Avoidance (controlling for anxiety)	-.35**	-.24*

* $p < .05$ ** $p < .01$

5.8.4 Attachment avoidance as a predictor of anger suppression

Hypothesis 3.5 proposed that attachment avoidance would predict variance in anger suppression scores. To test this hypothesis, a multiple regression model was developed. Preliminary analyses were carried out to ensure that the data did not violate the assumptions of multicollinearity, independent errors, non-zero variances, normality, homoscedacity and linearity. Analysis of standard residuals did not identify any outliers (Std. Residual Min = -2.528, Std. Residual Max = 2.601). Tests also revealed no issues with multicollinearity, as variance inflation factor (VIF) values were all below 5 (as recommended by Heirberger & Holland, 2013) and Tolerance statistics all exceeded 0.1 (the minimum level recommended by Tabachnick & Fidell, 2001). The assumption of independent errors was also met (Durbin-Watson value = 1.949, as was that of non-zero variances. Both the histogram and the normal P-P plot of standardized residuals suggested normally distributed errors, and a scatterplot of standardised predicted values confirmed that the data were

homoscedastic and linear. Thus, the data did not violate any of the above assumptions, confirming its suitability for regression analysis. As recommended by Cohen (1988) for regression analysis, an effect size of $R^2 = .02$ was considered to be a small effect, $R^2 = .15$ was considered a medium effect and $R^2 = .35$ was deemed to be a large effect.

At step 1, age, baseline FT and baseline self-report anger were controlled for. At this stage, neither age ($\beta = -.09, p = .428$), nor baseline self-report anger ($\beta = .10, p = .382$), were significant predictors of anger suppression, but baseline finger temperature was significant ($\beta = -.37, p = .002$). At stage 2, the addition of attachment avoidance and attachment anxiety to the regression equation resulted in a significant increase to R^2 ($R^2 = .29, R^2_{\text{change}} = .12, p < .001$; medium to large effect). In the final model, attachment avoidance ($\beta = -.36, p = .001$; large effect) and baseline finger temperature ($\beta = -.38, p = .001$; large effect) were significant predictors of anger suppression, with baseline finger temperature presenting as a marginally stronger predictor. This lends support for hypothesis 3.5 as attachment avoidance was a significant predictor of anger suppression in the context of a laboratory-cased anger induction paradigm.

Two further regression models were developed to determine whether attachment anxiety and/or avoidance were significant predictors of anger suppression, controlling for age, baseline finger temperature and baseline self-report anger (a) when all suspicious participants were excluded and (b) when only

those who suspected there was no other participant were excluded. The results of this additional analysis can be found in Appendix 9. The pattern of results identified when suspicious participants were excluded were consistent with that identified here, where all participants were included in the analysis.

Table 11. Hierarchical multiple regression analysis predicting anger suppression scores with attachment avoidance and attachment anxiety, controlling for age, baseline FT and baseline SR anger (n= 78)

	R^2	ΔR^2	F_{change}	R^2_{change}	B	95% CI	
						LL	UL
<i>Step 1</i>	.17	.14**	4.97	.17			
Age					-.09	-.18	.08
Baseline FT					-.36**	-.74	-.18
Baseline SR Anger					.10	-.27	.69
<i>Step 2</i>	.29	.24**	5.76	.12			
Age					-.12	-.20	.05
Baseline FT					-.38**	-.75	-.22
Baseline SR Anger					.10	.25	.68
Attachment Anxiety					.17	-.34	2.41
Attachment Avoidance					-.36**	-3.16	-.80

* $p < .05$; ** $p < .01$

5.8.5 Attachment anxiety and attachment avoidance as predictors of aggression

This study also investigated responses to an anger-induction in terms of whether the dimensions of attachment insecurity are related to levels of aggressive behaviour. As hypothesis 3.6 predicted that attachment anxiety would predict variation in aggression scores, a regression model was developed to determine whether

attachment anxiety and/or avoidance were significant predictors of aggression, controlling for age (See Table 11). Once again, preliminary analyses were carried out to ensure that the data did not violate the assumptions of multicollinearity, independent errors, non-zero variances, normality, homoscedasticity and linearity. Analysis of standard residuals did not identify any outliers (Std. Residual Min = -1.831, Std. Residual Max = 2.682). Tests also revealed no issues with multicollinearity, as variance inflation factor (VIF) values were all below 5 (as recommended by Heirberger & Holland, 2013) and Tolerance statistics all exceeded 0.1 (the minimum level recommended by Tabachnick & Fidell, 2001). The assumption of independent errors was also met (Durbin-Watson value = 2.199, as was that of non-zero variances). Both the histogram and the normal P-P plot of standardized residuals suggested normally distributed errors, and a scatterplot of standardised predicted values confirmed that the data were homoscedastic and linear. Thus, the data did not violate any of the above assumptions, confirming its suitability for regression analysis.

At Step 1 of this model, age was not a significant predictor of aggression scores ($R^2 = .12$, $p = .282$). The addition of attachment anxiety and attachment avoidance to the regression equation resulted in a significant increase to R^2 ($R^2 = .12$, $R^2_{\text{change}} = .11$, $p = .015$; small effect). Within the final model, attachment anxiety was a significant independent predictor of aggression ($\beta = .35$, $p = .004$), demonstrating a medium effect. Neither attachment avoidance ($\beta = -.10$, $p = .393$) nor age ($\beta = -.08$, $p = .492$) were significant predictors in the final model. This lends support for

hypothesis 3.6, as attachment anxiety predicted a significant amount of variance in aggression scores. Two further regression models were developed to determine whether attachment anxiety and/or avoidance were significant predictors of aggression, controlling for age, (a) when all suspicious participants were excluded and (b) when only those who suspected there was no other participant were excluded. The results of this additional analysis can be found in Appendix 9. The pattern of results identified when suspicious participants were excluded were consistent with that identified here, where all participants were included in the analysis. Therefore, the exclusion of suspicious participants did not alter the significance of this model.

Table 12. Hierarchical multiple regression analysis predicting aggression scores with attachment anxiety and attachment avoidance controlling for age (n= 78)

	R^2	ΔR^2	F_{change}	R^2_{change}	β	95% CI	
						LL	UL
<i>Step 1</i>	.02	.00	1.18	.02			
Age					-.12	-.07	.02
<i>Step 2</i>	.12	.09*	4.27	.11			
Age					-.08	-.06	.03
Attachment Anxiety					.35**	.25	1.24
Attachment Avoidance					-.10	-.63	.25

*p<.05; **p<.01

5.8.7 Summary of analyses

In summary, attachment anxiety was not significantly associated with pre- to post-test changes in self-reported anger or physiological measures, thus leading to the rejection of hypotheses 3.1 and 3.3. On the other hand, attachment avoidance was negatively related to pre- to post-test changes in self-reported anger, supporting hypothesis 3.2, but was similarly unrelated to physiological responding (rejecting hypothesis 3.4). However, it should be noted that paired sampled t-tests indicated that the anger induction procedure was successful, as self-reported anger and MAP significantly increase, while FT significantly decreased. Further, attachment avoidance was a significant predictor of anger suppression, lending support for hypothesis 3.5. Finally, attachment anxiety was a significant predictor of aggression scores measured through the Taylor Aggression Paradigm, while attachment avoidance was not, which supports hypothesis 3.6.

5.9 Discussion Study 2

This study provided a more real-time, ecologically valid investigation of attachment-related differences in anger regulation and aggressive behaviour. Specifically, Study 2 looked at the relationship between attachment insecurity, self-esteem, physiological and self-reported anger responses to an anger induction procedure and subsequent aggressive behaviour.

As research indicates that the use of suppression does not fully alleviate the full body of experiential, cognitive and behavioural aspects of emotion (Szasz et al., 2011), the investigation of both the physiological experience and self-reported expression of emotion is crucial to understanding attachment-related differences in emotional processing and regulation. Indeed, studies suggest that while suppression may reduce the likelihood of anger expression (i.e. self-reported anger and behavioural aggression), it may exacerbate physiological reactivity to anger arousing situations (Gross, 1998; Levenson, 1997). While Study 1b supported the proposal that suppression does not diminish the cognitive aspects of anger expression (i.e. hostility) for those high in attachment insecurity, this study aimed to determine whether anger suppression was a factor in physiological reactivity, self-reported anger and actual behavioural aggression for those high in attachment anxiety and/or attachment avoidance. Anger suppression scores were obtained by subtracting post-induction FT from post-induction self-report anger (i.e. anger expression – anger experience; Dworkin, 2015) to identify response patterns in line with the suppression of anger (i.e. a discrepancy between low self-reported anger and high physiological reactivity).

As predicted, attachment avoidance was associated with decreased self-reported anger change scores from baseline to post-induction. This is congruent with previous literature that demonstrated a negative association between attachment avoidance and self-reported anger (Diamond et al., 2006; Dozier &

Kobak, 1992; Mikulincer & Shaver 2007), and significantly lower levels of self-reported anger in those classified as avoidantly attachment (compared with those categorised as secure or anxious; Mikulincer, 1998). Some previous studies have implicated insecure attachment more generally in elevated self-reported trait anger (Dutton et al., 1994; Kobak et al., 1993; Meesters & Muris, 2002; Muris et al., 2004), but it seems that this relationship is most likely a result of the use of a combined 'insecurely attached' subscale, thus not differentiating between attachment anxiety and attachment avoidance. Instead, the results of the present study indicate that attachment avoidance is in fact related to reduced self-reported anger in response to an anger induction procedure, while attachment anxiety was unrelated to changes in self-reporter anger. The latter finding was somewhat unexpected as the majority of previous literature suggests that attachment anxiety (or categories of insecure attachment characterised by high anxiety; e.g. fearful avoidant and preoccupied) is associated with higher levels of anger (Calamari & Pini, 2003; Kidd & Sheffield, 2005; Mikulincer, 1998; Troisi & D'Argenio, 2004).

While there is a theoretical argument that those high in attachment anxiety may be likely to either suppress anger (to avoid alienating others; Brenning & Braet, 2013), or under-regulate the expression of anger (in order to cease unwanted behaviour in others; Campbell & Muncer, 2008) depending on their specific goal, the findings from this study suggest that this dimension is not associated with an increase in self-reported anger expression in the context of a negative feedback-based anger induction paradigm. The reasons as to why no significant relationship

was found can only be speculated upon in this thesis. Theoretically, it is possible that the negative self-appraisals associated with attachment anxiety (Collins & Read, 1994; Shaver & Clark, 1994) may cause them to perceive such adverse feedback as warranted, serving to confirm their negative model of the self. This proposition is supported to some extent by the negative relationship between attachment anxiety and self-liking found in this study. In other words, those high in attachment anxiety may not have been sufficiently angered by the negative feedback if they believed it was just, as anger is, by definition, a response to perceived injustice (Baumeister, Stillwell & Wotman, 1990). Future research adopting a negative feedback-based anger induction procedure should control for this by asking participants whether they believe that their markers comments were justified during the post-experiment manipulation check interview. It is also possible that participants were reluctant to admit feeling angered by the negative feedback in the presence of the researcher, thus not fully reflecting an ecologically realistic response to anger-inducing stimuli that might be achieved in a real-world situation. This issue is discussed in more depth in Chapter 6.1. Nonetheless, these findings suggest that there are distinct attachment-related individual differences in self-reported anger reactions, and future research should therefore continue to consider these dimensions independently in order to detect these differences.

Neither attachment anxiety nor attachment avoidance were significantly associated with physiological reactivity following the anger induction. This is

divergent from the majority of literature which suggests that both dimensions are associated with increased physiological arousal during emotional episodes (Dozier and Kobak, 1992; Spangler and Zimmermann, 1999). As physiological reactivity was also unrelated to self-reported anger responses, it is important to consider the potential limitation of the physiological measures used to detect emotional reactivity in this study. While it has long been argued that emotions evoke a synchronised pattern of alterations in one's experience, physiology and behaviour (Gross, 1998; LeDoux, 2012; Mauss, Levenson, McCarter, Wilhelm & Gross, 2005), a view that underpins most theories about the fundamental properties of emotion, there is extensive evidence to suggest that the changes that occur in each of these response systems may not function in as parallel a fashion as some theorists and researchers propose.

While some studies have found mild convergence between experience, behaviour and physiology for some emotions (Bradley & Lang, 2000; Hubert & de Jong-Meyer, 1990), the majority of research indicates that there may be little to no association between physiological reactivity and reported experience of emotion (Edelmann & Baker, 2002; Ferná'ndez-Dols, Sanchez, Carreran & Ruiz-Belda, 1997; Jacobs, Manstead, & Fischer, 2001; Mauss, Wilhelm, & Gross, 2004). While this may suggest that convergence does not exist, Mauss and colleagues suggest that it may have more to do with a lack of reliable methods for measuring physiological reactivity (Mauss, Levenson, McCarter, Wilhelm & Gross, 2005). The within-participant design used to measure participant's physiological responding across

two-time points (one in the absence of anger provocation, and one following provocation) is proposed to be the most effective method in identifying experiential-physiological coherence as it controls for possible between-subjects variance (Mauss et al., 2005; Rosenberg & Ekman, 1994).

However, there are a number of aspects regarding the nature of physiological measurement in this study that may explain the lack of coherence amongst measures. Mauss and colleagues (2005) suggest that, in order to exact physiological responses, the emotion being induced must be 'sufficiently intense'. It is therefore possible that, in this present study, the level of anger induced was simply too weak to uncover attachment-related differences in physiological reactivity. Mauss and colleagues also suggest that selecting appropriate measures of physiology to reflect specific emotions is an important aspect of uncovering associations between experience and physiological arousal. In the present study, an increase in mean arterial blood pressure and a decrease in finger temperature was used to reflect anger-related physiology. While these measures have been used in the past to measure reactivity to emotion (Gross, 1998; Gross & Levenson, 1993, 1997; Mauss, Cook & Gross, 2007; Richards & Gross, 1999), it is difficult to differentiate between arousal that reflects an increase in anger, and that which reflects other negative emotions such as anxiety or fear (an emotion which was found to increase following the anger induction in this study). Therefore, it is possible that these measures did not provide a discrete measure of anger reactivity, but instead reflect an increase in negative affect more generally.

Finally, there is also a possibility that this study did not reveal attachment related differences in physiological arousal because the nature of the task afforded participants the opportunity to aggress in what could be considered a socially acceptable way. As participants were told by the experimenter that they were free to choose the level of noise blast delivered to the other participant, the noise blast administration may have been viewed as an acceptable, or even encouraged, aspect of the required task. Indeed, a similar phenomenon is seen in the literature on perceived aggression legitimacy in contact sports, where aggression is deemed an acceptable aspect of gameplay and task completion (Conroy, Silva, Newcomer, Walker & Johnson, 2001; Mintah, Huddleston & Doody, 1999). If this was the case, the activation of a suppression strategy may not have been deemed necessary by participants in this context.

However, as outlined in both the pilot study for Study 2, and the results of Study 2 itself, the anger induction procedure significantly increased self-reported anger, and had a significant impact on physiology in a manner that was deemed commensurate with anger reactivity. This suggests that there were no glaring issues with the physiological measures used. Instead, one must consider the potential explanations for the lack of effect of attachment on the physiological scores in Study 2, when compared to previous studies (e.g. Gross, 1998; Gross & Levenson, 1993, 1997; Mauss, Cook & Gross, 2007; Richards & Gross, 1999). One key factor relating to the nature of the paradigm used in Study 2 is that the procedure was not

relational. In other words, there were no specific aspects of the task that could be seen to specifically trigger the activation of the attachment system (e.g. attachment-related threat, partner interaction). This may explain the lack of main effect where physiological reactivity is concerned, and further suggests that attachment-related differences may only exist in attachment-relevant contexts. In order to explore this further, future research should aim to replicate this study using romantic partners, where the participant believes that the negative feedback has been provided by their relationship partner.

Attachment avoidance was also a significant predictor of anger suppression following the anger induction procedure, lending support for the findings of Study 1b, in which attachment avoidance was associated with the use of suppression to regulate anger. This finding also converges with previous research highlighting that those high in attachment avoidance suppress emotional responses (Mikulincer & Shaver, 2003), and further proposes that this is also the case in the context of anger. While some research suggests that those high in attachment avoidance may be more likely to under-regulate, and thereby express, anger as a means of initiating withdrawal in others (Brenning & Braet, 2013), the majority of literature is in agreement that attachment avoidance is more consistently associated with a tendency to suppress all emotional expression, including anger (Diamond & Hicks, 2005; Diamond et al., 2006; Mikulincer & Shaver, 2003; Mikulincer, 1998; Vrticka and Vuilleumier, 2012). Theoretically, suppressing the outward expression of anger allows those high in attachment avoidance to maintain their disassociated and

disinvested outer exterior, and in this case, it is potentially a successful strategy as there was no relationship between attachment avoidance and aggression (discussed in more depth shortly). As attachment avoidance was also associated with low self-reported anger responses to the anger induction procedure, this provides evidence for the effectiveness of suppression for negating the outward expression of anger (Gross, 1998; Gross & Levenson, 1997; Szasz et al., 2011).

This study also investigated responses to the anger-induction in terms of whether the dimensions of attachment insecurity were related to levels of aggressive behaviour. Results from Study 1b suggested that attachment anxiety was indirectly associated with physically aggressive behaviour, through the under-regulation of anger and a lack of anger control. The findings of this present study support this, as attachment anxiety was a unique independent predictor of aggressive behaviour, possibly reflecting the under-regulation and poor anger control processes associated with this dimension in Study 1b, and in previous literature (Lopez, 2001; Wei et al., 2003; Wei et al., 2005). Further, previous literature does indicate that those who express anger habitually (i.e. leave it under-regulated or uncontrolled) tend to express elevated levels of aggression when faced with insulting criticism (Bushman, Baumeister & Phillips, 2001). However, as attachment anxiety was un-related to self-reported anger and physiological arousal following the anger induction, it is not possible to determine whether their anger was under-regulated or poorly controlled. This can only be speculated upon, in that it could be argued that physical aggression itself (measured using the TAP) is a

reflection of under-regulated or uncontrolled anger. As such, the literature does often refer to aggressive behaviour as a direct reflection of unregulated anger (Fernandez, 2008; Novaco, 1976). Therefore, it could be inferred that attachment anxiety may be related to the under-regulation of anger in this study, as it is a significant independent predictor of aggressive behaviour. Taken together, this suggests that not only is attachment anxiety related to self-reporting an increased dispositional tendency to behave more aggressively (i.e. trait physical aggression), it is also associated with a tendency to react aggressively when provoked (i.e. with negative feedback, as was the case in the anger induction procedure used in this study).

While attachment avoidance was not significantly associated with aggression at a univariate level, moderator analysis was conducted to determine whether the interaction between attachment avoidance and anger suppression was a unique predictor of aggression scores. However, the interaction between attachment avoidance and anger suppression was not significant in predicting variance in aggression, suggesting that level of anger suppression did not have an impact on the relationship between attachment avoidance and aggression. This provides support for the findings of Study 1b, in which this dimension was not predictive of physical aggression. Further, this provides additional evidence to suggest that those high in attachment avoidance suppress the outward expression of anger (via both self-reported anger and behavioural aggression).

5.10 Conclusion Study 2

This study extended the findings of Studies 1a and 1b by providing a more real-time, ecologically valid investigation of attachment-related differences in anger regulation and aggressive behaviour. In line with previous literature (Diamond et al., 2006; Dozier & Kobak, 1992; Mikulincer, 1998; Mikulincer & Shaver 2007), attachment avoidance was associated with decreased self-reported anger change scores from baseline to post-induction. Attachment avoidance was also a significant independent predictor of anger suppression following the anger induction procedure, lending support for the findings of Study 1b, and extending the evidence for an association between attachment avoidance and suppression to the context of anger. It is proposed that the suppression of anger allows these individuals to preserve their disinvested façade, and the findings of this study suggest that this may be an effective strategy where anger is concerned, as attachment avoidance did not predict aggression or physiological responses to the anger induction procedure.

Attachment anxiety, on the other hand, was not significantly related to changes in self-reported anger scores from pre- to -post induction, in contrast to most prior literature (Calamari & Pini, 2003; Kidd & Sheffield, 2005; Mikulincer, 1998; Troisi & D'Argenio, 2004). It is possible that the negative self-model associated with attachment anxiety (Collins & Read, 1994; Shaver & Clark, 1994) led individuals high on this dimension to perceive the negative feedback as justified, and thus were not angered by it.

However, attachment anxiety did present as a significant independent predictor of aggressive behaviour, further supporting the results of Study 1b, in which attachment anxiety was an indirect predictor of physical aggression, through the under-regulation of anger and a lack of anger control. Collectively, these findings indicate that attachment anxiety is associated with both an increased dispositional tendency to behave more aggressively (i.e. trait physical aggression), and a tendency to react aggressively when provoked (i.e. with negative feedback).

Taken together, these findings suggest that there are distinct attachment-related individual differences in responses to an anger induction procedure, and future research should therefore continue to consider attachment anxiety and attachment avoidance independently in order to detect these differences. This study suggests that suppression may be an effective technique in alleviating the external expression and internal experience of anger for those high in attachment avoidance; however, the results of Study 1b suggest that it may be limited in terms of dealing with the hostile cognitions associated with anger. Finally, the present study suggests that attachment anxiety is an independent risk factor for aggressive behaviour, and such, a focus on the development of adaptive methods for controlling and regulating one's anger may help reduce aggressive responding for those high in attachment anxiety.

Chapter 6. General discussion

Fundamentally, the experience of anger is posited to be functionally adaptive, as it alerts an individual to the potential appearance of a threat, often some form of injustice or ill treatment, in their environment (Kemper, 1987; van Dijk, et al., 2008). However, when anger is experienced chronically, or expressed aggressively, it has been associated with serious consequences including poor emotional well-being, maladaptive interpersonal functioning and general social maladjustment (Lazarus, 1996; Mauss, Bunge & Gross, 2007). The studies presented in this thesis are among the first to explore the relationship between adult attachment and anger expression, taking into account the role of attachment-related difference in anger regulation. The following chapter presents a wider discussion of the findings uncovered within this project. These findings will be considered in relation to the research questions raised earlier in this thesis and the previous research presented in the preceding review. Theoretical and practical implications of the findings will also be discussed, including consideration of how these results might inform clinical practice, and recommendations will be made for continued investigation in this area.

The present thesis investigated the relationship between adult attachment, dispositional anger and anger expression, taking into account the role of anger regulation, to develop an understanding of attachment-related differences in the experience and expression of anger in the normal population. As previously stated, attachment theory provides an invaluable framework for the study of individual

differences in emotion regulatory processes in adulthood (Mikulincer, Dolev & Shaver, 2004; Mikulincer & Shaver, 2003); however, there is a distinct lack of research considering attachment-related differences in the regulation of anger. While a growing body of research supports an association between attachment insecurity and the aggressive expression of anger (Critchfield, Levy, Clarkin & Kernberg., 2008; Mikulincer, 1998; Mikulincer & Shaver, 2007; Simons, Paternite & Shore, 2001), there is little research considering the underlying mechanisms that facilitate this relationship. Understanding attachment-related differences in the regulatory process implemented in the experience and expression of anger can have profound implications for clinical practice with regards to the effective management of dysfunctional anger. Specifically, this research project examined the relationships between two adult attachment dimensions (attachment anxiety and avoidance), dispositional anger, three specific anger regulation strategies (suppression, under-regulation and anger control) and aggression (verbal aggression, physical aggression and hostility).

The first study in this project used a questionnaire-based cross-sectional research design to determine the extent to which variation in adult attachment dimensions could predict variation in dispositional anger. In Study 1b, data collected for study one was used to determine whether the use of specific anger regulation strategies (anger suppression, under-regulation and anger control) played a mediating role in the relationship between attachment insecurity and three facets of dispositional aggression (physical aggression, verbal aggression and hostility). Finally,

a final correlational study was designed to allow for the more in-depth and implicit investigation of the relationships above. Specifically, this study looked at the relationship between attachment insecurity, physiological responses to an anger induction procedure and subsequent aggressive behaviour. In terms of analysis, regression techniques (including linear regression, parallel mediation analysis and moderation analysis) were used to determine whether variation in dispositional anger and aggression variables could be predicted from variation in the dimensions of attachment insecurity, and whether these relationships were subject to mediating or moderating effects from the use of specific anger regulation strategies and self-esteem.

In the data collected for Studies 1a and 1b, males were significantly higher in self-competence, physical aggression, verbal aggression and hostility than females, suggesting that males are dispositionally higher on these four constructs. This provides support for the previous identification of gender differences in both self-esteem and aggression (Fraley, 2012; Tafari & Swann, 1995). Based on results from the first set of data, and previous research, one would have expected study 2 to reveal significant gender differences in self-reported anger, self-esteem variables and behavioural aggression (measured through the TAP). However, no significant gender differences were identified in this sample. As the sample size for this study was relatively small ($n=60$), and over 80% of the participants were female, it's possible that not enough males were tested to detect discrete gender-related differences, especially as the gender differences in self-esteem are often modest

(Bleidorn, Arslan, Denissen, Rentfrow, Gebauer, Potter & Gosling, 2015). However, a review conducted by Stoney and Engebretson (1994) concluded that the level of anger experienced by males and females were in fact relatively similar, and that differences only arose in their preferred method of anger expression (with females more likely to express outwardly, and males more likely to inhibit anger expression). This was supported by a meta-analytic review conducted by Archer in 2004, which found no gender differences in anger, but found that males were more likely to behave in physically aggressive ways than females (Archer, 2004). Archer also found that while there were gender differences in indirect aggression, with females demonstrating significantly higher scores than males, this difference was limited to late childhood and adolescence. Further, Bettencourt and Miller (1996) found that while males usually demonstrate higher aggression levels than females in lab-based aggression tasks where provocation is low, there are no significant gender differences in instances where provocation is high. As the Taylor Aggression Paradigm is a high provocation measure of aggression, this may offer an explanation for the lack of gender differences in the present study.

Collectively, this suggests that males may display higher dispositional levels of physical aggression, verbal aggression and hostility than females. They may also demonstrate modestly elevated levels of self-competence and trait anger than females, but these differences may not be substantial enough to be detected in smaller samples. Additionally, it seems that the gender differences seen in some forms of aggression, such as those mentioned above, may not be present for

indirect aggression, for which gender differences are only identifiable earlier in the lifespan.

In the data collected for studies 1a and 1b, age was negatively correlated with trait anger, anger suppression, the under-regulation of anger, physical aggression and hostility, suggesting that age is associated with decreasing levels of dispositional anger, maladaptive anger regulation strategies (suppression and under-regulation), and two aspects of trait aggression (physical aggression and hostility). Additionally, age was positively associated with self-competence, indicating that as age increases, so does an individual's level of self-competence. Data from study 2 demonstrated positive correlations between age and mean arterial blood pressure (MAP) at both baseline and post-induction, and with finger temperature (FT) at post-induction. This suggests that MAP increases with age regardless of the anger induction (suggesting that as age increases, MAP increases), while age is positively associated with FT only following the anger induction (suggesting that as age increases, FT also increases, indicating reduced FT reactivity to the anger induction in older participants).

Taken together, these results suggest that maladaptive functioning and externalising behaviours reduce with age, a concept well documented throughout the psychological literature (Bongers, Koot, van der Ende & Verhulst, 2004). They also indicate that overall mean arterial blood pressure increases with age, as would be expected (Pinto, 2007), but that finger temperature reactivity decreases, the

latter of which may suggest a reduced reactivity to anger inducing situations as one ages. However, as this study took a cross-sectional approach, it is possible that these findings in fact reflect generational differences in self-esteem and anger-related construct, as opposed to longitudinal changes in these variables.

6.1 Key findings and their implications

6.1.1 Adult attachment is a predictor of trait anger and anger responsivity

Individual differences in the experience and expression of anger are thought to be dispositional (Schum et al., 2003). The present thesis provides preliminary evidence to suggest that one's level of dispositional anger can be partially predicted by their level of attachment anxiety. Additionally, this thesis demonstrated that reduced self-reported anger responsivity in anger-provoking situations is associated with higher levels of attachment avoidance. As the inappropriate expression of anger has been linked with an array of negative interpersonal, psychological and physical outcomes (e.g. Lazarus, 1996; Mauss et al., 2007), identifying risk factors for increased levels of day-to-day anger is of grave importance to allow evidence-based factors to be targeted during anger interventions.

In Bowlby's (1988) original conceptualisation of attachment-related behaviours, he proposed that dysfunctional anger was somewhat typical for those displaying high levels of attachment insecurity. Bowlby suggested that elevated trait

anger can present as a consequence of the lack of congruency between an individual's underlying goal of proximity and emotional connection, and their explicit effort to avoid such closeness in order to protect themselves from further rejection (Bowlby, 1988). While, theoretically, this seems to infer that both attachment avoidance and attachment anxiety are likely to be associated with high levels of anger, Study 1a demonstrated that attachment anxiety was a unique independent predictor of dispositional anger, and that neither attachment avoidance nor self-esteem contributed significantly to a predictive model of trait anger. This suggests that those high in attachment anxiety are more likely to experience frequent and intense episodes of anger on a day-to-day basis, with or without provocation (Spielberger et al., 1999).

This supports previous literature that illustrates that attachment anxiety is specifically important in predicting elevated levels of dispositional anger (Calamari & Pini, 2003; Mikulincer, 1998). As discussed in the literature review of this thesis, a number of studies examining the relationship between attachment insecurity and anger has applied categorical measures of attachment. These studies often suggest that those classified as being preoccupied or fearful-avoidant (Kidd & Sheffield, 2005; Troisi & D'Argenio, 2004) and those categorised more generally as being 'insecurely attached' (Dutton et al., 1994; Kobak et al., 1993; Meesters & Muris, 2002; Muris et al., 2004) demonstrate increasing levels of trait anger. In fact, Dutton and colleagues (1994) suggested that the combination of high attachment anxiety and high attachment avoidance (reflecting fearful avoidant attachment), should be

considered as an 'angry attachment' style. However, the use of a dimensional measure of attachment in the present thesis allowed for a more in-depth exploration of how these two constructs are related to anger independently of one another. Specifically, by controlling for attachment anxiety, it was possible to determine that attachment avoidance was not an independent predictor of trait anger. Furthermore, moderation analysis demonstrated that the interaction between attachment anxiety and attachment avoidance was not significant, providing additional evidence for attachment anxiety as an independent predictor of trait anger, and suggesting that variation in attachment avoidance does not influence this relationship. This suggests that the relationship found between anger and avoidant styles of attachment in previous studies is most likely a result of the high attachment anxiety that also characterises the fearful-avoidant attachment category, and does not imply an 'angry attachment' style as suggested by Dutton and colleagues (Dutton et al., 1994). This provides evidence both for the ability of attachment anxiety to predict variation in trait anger, and the value of dimensional measures of attachment, over the categorical approach, to discern how an individual's internal working models of the self (attachment anxiety) and of others (attachment avoidance) are independently related to various psychological processes, including the experience of anger.

The reasons as to why attachment anxiety, specifically, is associated with elevated levels of dispositional anger can only be speculated upon at this point, as further research is needed to clarify this relationship. Theoretically speaking, it is

possible that the increased dispositional anger associated with attachment anxiety reflects the hyperactivation of the attachment system commonly linked with this dimension (Bartholomew & Horowitz, 1991). Mikulincer and Shaver (2002) suggest that the hyperactivation strategy associated with attachment anxiety results in hypervigilance towards threats and attachment-related cues including interpersonal rejection, as well as the maintenance of hope that proximity seeking might be a viable option, which can result in what is referred to by Bowlby as 'anger of despair'. As anger is considered to be a threat signal of sorts (Kemper, 1987; van Dijk, et al., 2008), it is possible that this attentional bias for threatening information gives rise to a state of constantly elevated anger. Thus, as anger suppression is such a cognitively demanding task (Mikulincer, Shaver, Gillath & Nitzberg, 2004), this may offer an explanation as to why it is difficult for those high in attachment anxiety to suppress their anger. In line with this, attachment anxiety has been linked to a threat-related attentional bias in previous studies (Mikulincer, Gillath & Shaver, 2002). However, in order to clarify whether this is the case, more specific research is needed to determine whether threats that may induce anger (e.g. injustice, ill treatment) are subject to this bias in those high in attachment anxiety. Investigation of such a bias could provide further insight into whether attachment anxiety is related to the perception of injustice and of 'being hard-done-by' in the majority of every day interactions; and whether this mediates the relationship between attachment anxiety and dispositional anger. Additionally, future research should investigate this in more depth by identifying under which circumstances those high in anxiety express anger (e.g. does this only happen under interpersonal threat?),

and their intended goals of anger expression (e.g. do they express anger in an attempt to eliminate that threat?). This would add further support to the theory of attachment anxiety as a predictor of elevated dispositional anger.

The additional exploration of the relationship between attachment and anger in a laboratory setting lends an even deeper understanding of the relationship between two these constructs. In Study 2 of this thesis, attachment avoidance was negatively associated with changes in self-reported anger from baseline to post-induction, suggesting that as attachment avoidance increased, responses to the anger induction via self-reported anger decreased. This finding is concordant with previous literature that suggests that those high in attachment avoidance do not respond to emotion induction with increases in self-reported affect (Diamond & Hicks, 2005; Mikulincer, 1998). This is generally proposed to be reflective of the suppression technique associated with attachment avoidance, which supports the findings of Studies 1b and 2, in which attachment avoidance was associated with the suppression of anger (discussed in more depth below). Therefore, this finding may provide further defence for the proposition that those high in attachment avoidance suppress the outward expression of anger, at least in terms of self-report. While the results of Study 1a suggest that attachment avoidance is unrelated to dispositional anger, the results from Study 2 indicate that this dimension is in fact associated with reduced anger responsivity to anger-provoking situations.

Conversely attachment anxiety was not significantly related to changes in

self-reported anger. This was unexpected, as Study 1a of this thesis found attachment anxiety to be associated with elevated levels of trait anger, and previous research suggests that those high in attachment anxiety respond to emotion-evoking situations with increased anger reporting (Diamond & Hicks, 2005; Mikulincer, 1998). However, the fact that anger significantly increased across the sample, from baseline to post-induction, does suggest that the procedure was strong enough to induce changes in self-reported anger. Alternatively, it is possible that the lack of relationship between attachment anxiety and anger change illustrates a reluctance to admit feelings of anger in the presence of the researcher. As this study involved participant-researcher interaction throughout, those high in attachment anxiety may have felt uncomfortable reporting that they were angered by the research process for fear of disapproval or being viewed negatively by the researcher (i.e. reflecting the social desirability effects commonly associated with anger and aggression; Vigil-Colet et al., 2012). Another possible explanation is that the chronically negative self-view associated with attachment anxiety (Collins & Read, 1994; Shaver & Clark, 1994) may have rendered the negative feedback approach to anger induction somewhat ineffective, as those high in attachment anxiety already perceive themselves to be incompetent, and therefore possess an internalised expectation of being viewed in this way by others (Hepper & Carnelley, 2011). It is therefore possible that those high in attachment anxiety would view the negative feedback they were given as justified and confirmatory of their expectations, and thus not respond aversively. Future research should aim to clarify this further, by asking participants in a negative feedback-based anger induction

whether they believe that their marker's comments were justified, and taking this into account during analysis.

The lack of association between physiological reactivity and either attachment dimension was unexpected, and affords a potentially less clear explanation. While some research suggests that those high in avoidance are able to effectively suppress the physiological arousal associated with emotional activation (Fraley & Shaver, 1997), the majority of studies advocate that both attachment anxiety and attachment avoidance are concurrent with heightened emotion-related physiological reactivity (Dozier & Kobak, 1992; Spangler & Zimmermann, 1999). As both attachment anxiety and attachment avoidance were significantly related to anger suppression in Study 1b, it is possible that this lack of physiological reactivity reflects the effective suppression of anger-related physiology. However, the majority of research on suppression, of both anger and other emotions, consistently demonstrates that, while suppression may effectively dampen the outward expression of emotion, it does little to quell its internal experience (Richards & Gross, 1999; Szasz et al., 2011). Further, in the context of physical aggression, Study 1b suggested that the relationship with attachment avoidance was influenced by under-regulation and low anger control, not anger suppression. Rather, it is perhaps more plausible that the lack of association between attachment insecurity and physiological reactivity uncovered in Study 2 is down to the fact that the procedure was not conducted in a relational context, and thus, attachment-related emotional defences may not have been activated. Overall, the findings from this thesis indicate

that attachment anxiety is related to higher levels of trait anger, whilst attachment avoidance is specifically related to reduced anger responsivity in instances where anger is provoked.

6.1.2 Adult attachment dimensions are differentially associated with the same regulation processes as in other emotional contexts

As predicted, attachment-related differences in anger regulation processes were also found within this thesis. The chronic use of maladaptive anger regulation techniques has been associated with a variety of negative health outcomes including coronary heart disease (Everson-Rose & Lewis, 2005; Miller et al., 1996; Sirois & Burg, 2003), hypertension risk (Vogele et al., 1997), higher perceived experience of pain (Quartana & Burns, 2007; Van Middendorp et al., 2010), and reduced responsivity to pain management techniques (Burns et al., 1998). Study 1b of this thesis suggested that attachment insecurity may be differentially associated with the maladaptive regulation of anger. Specifically, prior research indicates an association between attachment anxiety and hyperactivation of the attachment system, resulting in the under-regulation of emotion (Bartholomew and Horowitz, 1991; Shaver & Mikulincer, 2007) while attachment avoidance has been consistently related to attachment system deactivation through the use of emotion suppression (Caldwell & Shaver, 2012; Mikulincer & Shaver, 2003; Schore & Schore, 2008). Results from this thesis support the relationship between adult attachment insecurity and maladaptive anger regulation, suggesting that it may facilitate the

relationship between insecure attachment and both hostility and dispositional physical aggression.

As expected, attachment avoidance was associated with both dispositional anger suppression (in Study 1b) and a tendency to suppress self-reported anger when provoked (i.e. to report anger levels that are incommensurate with increases in physiological activity; as seen in Study 2). While the association between attachment avoidance and suppression has been well documented in previous studies concerning the regulation of negative emotions (Caldwell & Shaver, 2012; Mikulincer & Shaver, 2007), this study is among the first to consider and support this relationship in the context of anger. Conversely, attachment anxiety was associated not only with low anger control and the under-regulation of anger, resulting in its outward manifestation, but also with anger suppression. While an association between attachment anxiety and the former two was expected, the latter was unexpected and somewhat surprising. Previous literature suggests that those high in attachment anxiety have a tendency to under-regulate negative emotions, often resulting in a flood of emotional expression (Gentzler, Kerns & Keener, 2010). In the context of Study 1b, the findings suggest that anger suppression, the under-regulation of anger and low anger control were all significant mediators in the relationship between attachment anxiety and hostility, while attachment anxiety was indirectly related to physical aggression through the latter two variables only. This may suggest that those high in attachment anxiety do, at times, suppress anger. As attachment avoidance was also indirectly associated with hostility through anger

suppression, these findings suggest that suppression is especially key in predicting hostile cognitions in the context of attachment.

The theoretical underpinnings of the relationship between attachment and anger regulation can only be speculated on at this stage. However, as attachment-related differences in emotion regulation are goal-oriented (Gratz & Roemer, 2004), suppressing anger may serve a specific purpose for highly avoidant individuals. As those high in attachment avoidance strive to display autonomy and demonstrate, whether legitimate or not, a lack of desire for close relationships (Kobak, et al., 1993), it is possible that this goal is met by the same anger suppression strategy as seen in other emotional contexts (Diamond & Hicks, 2005; Diamond et al., 2006), as anger could be construed as implying emotional investment in an interaction or relationship (Cassidy & Kobak, 1988; Mikulincer & Shaver, 2007). Therefore, by suppressing their anger, they can maintain this sense of interpersonal detachment.

The findings of this thesis are in contrast to research carried out by Brenning and Braet (2013), who suggested that the regulatory processes associated with attachment anxiety and attachment avoidance are emotion-specific, and that different strategies may be implemented for anger as opposed to sadness and other negative emotions. While Brenning and Braet found both attachment dimensions to be related to the under-regulation of anger, this thesis found that the regulation processes associated with attachment anxiety and attachment avoidance were consistent with those identified in previous studies for other negative emotions

(Bartholomew & Horowitz, 1991; Cassidy & Berlin, 1994; Cassidy & Kobak, 1988; Mikulincer & Florian, 1998; Mikulincer & Shaver, 2007). Specifically, attachment avoidance was associated with the suppression of anger in Study 1b and Study 2, while attachment anxiety was associated with the under-regulation of anger and poor anger control in Study 1b. However, as Brenning and Braet (2013) conducted their study with early adolescents (age 11-16), it is possible that the suppression technique is not yet fully engrained at this stage in development, as it is thought that this technique becomes more habitual over time as its usefulness for goal achievement is established (Shaver & Mikulincer, 2002). Furthermore, it is possible that, in early adolescence, the consequences of under-regulated anger are less severe than in adulthood, where there is a more salient risk of expressed anger interfering with social functioning.

Study 2 provided a more real-time, ecologically valid investigation of attachment-related differences in anger regulation, affording insight into whether or not the suppression and under-regulation processes associated with the attachment dimensions in Study 1b were implemented in an actual anger-inducing situation. This study found attachment avoidance to be a significant predictor of anger suppression scores. This supports the findings of Study 1b, in which attachment avoidance was associated with the use of suppression to regulate anger. This is also in line with previous research highlighting that those high in attachment avoidance suppress emotion (Biernbaum, 1999; Calamari & Pini, 2003), and further proposes that this is also the case for anger. While the results from Study 2 suggest that this

suppression technique may be successful in minimising the angry reactions (in terms of self-reported anger and physiological arousal), Study 1b suggest that this technique is not effective in stemming the hostile cognitive appraisals that closely follow the experience of anger (Buss & Perry, 1992). Instead, when highly avoidant individuals attempt to suppress anger, it manifests itself in less overtly obvious ways (i.e. through increased feelings of bitterness and suspicion of others; Szasz et al., 2011). Theoretically, this offers greater insight into the association between attachment avoidance and anger suppression, suggesting that this technique may be useful in alleviating the affective and behavioural aspects of anger, but does not effectively reduce the cognitive component.

6.1.3 Attachment anxiety predicts aggressive behaviour and hostility, while attachment avoidance predicts hostility alone

In line with previous literature, the research conducted within this thesis found that both attachment anxiety and attachment avoidance were significantly related to increasing levels of dispositional hostility, through the use of specific maladaptive anger regulation techniques (Critchfield et al., 2008; Mikulincer & Shaver, 2007). As hostility is thought to reflect a mistrust and suspicion of others (Buss & Warren, 2000), it is unsurprising that this construct was predicted by attachment anxiety and attachment avoidance, both of which are characterised by apprehension about the reliability and availability of support figures (Mikulincer & Shaver, 2007). As the

Aggression Questionnaire measures hostile aggression in terms of negative expectations and beliefs about others, it is possible that these high levels of hostility are representative of the negative internal working model of others ingrained in those who are insecurely attached (Muris et al., 2004). This relationship between insecure attachment and hostility is consistent with previous research in both subclinical (Meesters & Muris, 2002; Mikulincer, 1998; Muris, Meesters, Morren & Moorman, 2004; Pederson, 1999) and clinical populations (Critchfield, Levy, Clarkin & Kernberg, 2008). The fact that suppression mediated the relationship between both attachment insecurity dimensions and hostility, also supports Gross's theory that suppression is a response-focused strategy, which takes place once emotion processing has already begun (Gross, 1998), suggesting that attachment avoidance may be associated with a tendency to suppress emotions once they arise, rather than a general inattention towards emotional information (Dewitte, Koster, Houwer & Buysse, 2007). Further, Study 1b also revealed that attachment anxiety was indirectly related to physical aggression, through the under-regulation of anger and poor anger control. Prior to now, this relationship has almost exclusively been considered in the intimate partner violence (IPV) literature, in which attachment anxiety has been linked with physical and psychological abuse in intimate relationships (Dutton et al., 1994; Roberts & Noller, 1998). Therefore, this thesis extends these findings to indicate that attachment anxiety is also a risk factor for physical aggression out with the IPV context.

However, prior literature has also implicated attachment avoidance in

physical aggression (Gormley, 2005; Mauricio & Gormley, 2001; Mauricio, Tein, & Lopez, 2007; Schumacher, Slep, & Heyman, 2001). This is in contrast to the present thesis, in which attachment avoidance was neither directly nor indirectly associated with physical aggression. As the average physical aggression score displayed in this sample fell closely in line with the norms reported by Buss and Perry in a large sample of undergraduate college students (Buss & Perry, 1992), it is unlikely that this finding is a result of particularly low levels of physical aggression in this sample. Rather, the lack of association in this case may be due to the nature of the sample utilised, as the studies above have approached the attachment-physical aggression link within an IPV context, where abuse is by default more likely to be present than in the general population. This may also offer an explanation for the lack of association between attachment insecurity and verbal aggression, as the majority of studies identifying a link have done so in terms of verbal abuse within intimate relationships (e.g. Dutton et al., 1994).

Study 2 administered a more indirect measure of aggression to identify whether the attachment dimensions were still associated with aspects of aggression in a real-world anger-inducing situation. Firstly, in concordance with the results from Study 1b, attachment avoidance was unrelated to aggressive behaviour, as measured via the Taylor Aggression Paradigm. This provides further support for the theoretical link between attachment avoidance and the suppression of anger expression (via both self-reported anger and behavioural aggression).

While avoidance was not found to be a predictive factor for aggressive behaviour in Study 2, attachment anxiety was a unique independent predictor, arguably reflecting the under-regulation and poor anger control processes that were linked with this dimension in Study 1b, and in other studies throughout the literature (Lopez, 2001; Wei et al., 2003; Wei et al., 2005). This also lends support to previous research that indicates an association between aggressive responding to insulting criticism and the habitual expression of anger (Bushman, Baumeister & Phillips, 2001). Therefore, it is argued in this thesis that the physical aggression, displayed through the TAP task, serves as an indication of under-regulated or uncontrolled anger. This proposition is supported by literature in which physical aggression is discussed as a direct measure of unregulated anger (Fernandez, 2008; Novaco, 1976). Therefore, it could be argued that attachment anxiety was associated with the under-regulation of anger in Study 2, as it was a significant independent predictor of aggressive behaviour. However, it must be noted that attachment anxiety was not significantly related to self-reported anger or physiological reactivity to the anger induction procedure, and so this can only be speculated upon at this point. Collectively, these findings suggest that attachment anxiety is a significant risk factor for an increased dispositional tendency to behave more aggressively (i.e. trait physical aggression), and is also associated with a tendency to react aggressively when provoked (i.e. in response to negative feedback).

Theoretical arguments for a relationship between attachment anxiety and under-regulated or uncontrolled aggression propose that it may be used by those

high in attachment anxiety as a means of diminishing unfavourable or threatening behaviours in others (Campbell & Muncer, 2008). However, while the findings of the present study support attachment anxiety as a predictor of aggressive behaviour, the fact that the aggression task took place after the negative feedback had already been received by participants calls into question the goals of aggression in this context, as acting aggressively during the TAP task could not counteract the negative feedback in any way. However, it is still possible that the aggression displayed during the TAP task was used as a means to indicate anger and distress to the person who supposedly provided the feedback, in the hope that this same negative experience would not recur. A further possible explanation is that outlined by Bushman, Baumeister and Phillips (2001), who suggest that anger is expressed through aggressive behaviour with the goal of diminishing the experience of anger (i.e. getting it out of their system, or 'venting'). Future research should consider a procedure in which two negative feedback tasks are used, presented at either side of the TAP task, so as to better determine whether the goal of aggression, where attachment anxiety is concerned, is to reduce threatening or frustrating behaviour in others or reduce the adverse internal experience of anger.

6.1.4 Attachment, Self-Esteem and Anger

Study 1a considered the potential for two related, but distinct, facets of self-esteem (self-liking and self-competence) to predict variation in trait anger in addition to attachment insecurity. An abundance of both theoretical literature and empirical

research suggests that attachment anxiety is associated with lower and less stable self-esteem (Dutton et al., 1994; Kobak et al., 1993; Meesters & Muris, 2002; Muris et al., 2004), but that attachment avoidance may in fact be characterised by a more positive model of the self (Brennan & Bosson, 1998; Foster et al., 2007; Park et al., 2004). As those high in attachment anxiety have a chronically negative self-model, characterised by low self-efficacy and a view that others do not see them as worthy of attention or love, it seems intuitive that their self-esteem would be substantially lower than someone who was securely attached. Indeed, Study 1a found a significant negative association between attachment anxiety and both self-liking and self-competence. However, while attachment avoidance initially appeared to demonstrate a similar significant relationship with self-esteem, these associations became non-significant when controlling for attachment anxiety, suggesting that the high inter-correlation between attachment avoidance and attachment anxiety was responsible for this. Therefore, this study provides support, using a dimensional measure of attachment, for a finding that has been identified with categorical measures; that low self-esteem is associated with attachment styles characterised by high attachment anxiety, but not with those in which there is an absence of attachment anxiety

In partial consistency with Study 1a, Study 2 found that whilst controlling for attachment avoidance, attachment anxiety remained significantly related to self-liking, but not to self-competence. However, in contrast to Study 1a, Study 2 revealed that, when controlling for attachment anxiety, attachment avoidance

remained significantly associated with both self-liking and self-competence. This suggests that as attachment insecurity increases, self-liking decreases, but self-competence only increases alongside attachment avoidance. The fact that attachment avoidance alone remained significantly associated with self-competence supports prior literature that suggests that this dimension is associated with more concern surrounding self-efficacy beliefs, while attachment anxiety is more commonly linked with a tendency to rely more on how others perceive them to construct their self-view (e.g. Hepper & Carnelley, 2011). However, it suggests that those high in attachment avoidance appear to rely on both. A possible explanation for this difference in findings between Study 1a and Study 2 may be down to the sample used in Studies 1 and 2. The higher proportion of student participants in Study 2 may have uncovered more salient attachment-related difference in self-esteem constructs as student samples can often experience heightened levels of stress and vulnerability due to the transition to university life (Ross, Niebling & Heckert, 1999).

While attachment anxiety is a risk factor for low self-esteem, it has long been argued that low self-esteem is also implicated in a variety of externalising issues such as criminal activity and aggressive behaviour (Donnellan et al., 2005; Fergusson & Horwood, 2002; Sprott & Doob, 2000). D’Zurilla and colleagues found that low self-esteem was related to higher levels of trait anger and hostile aggression, as measured by the Aggression Questionnaire (Buss & Warren, 2000). This relationship between low self-esteem and hostile aggression was also found in a large study by

Buss and Perry (1991), in which there was no link between self-esteem and verbal or physical aggression. Walker and Bright (2009) reviewed research on self-esteem and violent behaviour, spanning two decades from 1986 to 2006, and found that the majority of literature revealed a negative relationship between self-esteem and violent behaviour, even when controlling for gender, depressive symptoms, narcissism and socioeconomic status (Trzesniewski et al., 2006; Webster, 2006).

Low self-esteem has also been linked to domestic violence (Papadakaki et al., 2009) and violent criminal activity (Trzesniewski et al., 2006). In Study 1a, trait anger was negatively associated with self-liking (but not self-competence), suggesting that one's socially dependent affective judgment of the self, prescribed by how they believe others view them, is associated with their levels of dispositional anger, whereas their perception of their capabilities and efficacy in achieving desired goals appears to be less relevant to anger. Thus, a self-derogating perception of the self as not valued by others is related to increased levels of trait anger, which may be seen to suggest that the combination of high attachment anxiety and low self-liking could predict especially elevated trait anger scores. However, in Study 1a, self-liking and self-competence failed to predict additional variance in trait anger over and above attachment anxiety. This may be down to the fact that the association found between trait anger and self-liking was relatively weak. Moreover, a growing body of research suggests that stability of self-esteem, which has been found to impact negatively on well-being and emotional functioning (Brennan & Bosson, 1998; Foster et al., 2007; Park et al., 2004), may be a more important factor in predicting anger

and anger-related behaviours than basic dispositional levels of self-esteem. However, this present thesis cannot allude to this as stability of self-esteem was not measured in these studies.

Collectively, the findings from this thesis have considerable implications for almost any therapeutic setting in which poorly regulated anger or aggressive behaviour is the primary concern. Perhaps the most glaring of which is a forensic setting, in which the development of effective anger regulation techniques is a primary focus. The Scottish Prison Service (SPS) currently delivers the Controlling Anger and Regulating Emotions Programme (CARE; SPS, 2015) for offenders who present with poor anger control capacities and have a history of aggressive behaviour that has been directly linked to unregulated anger. CARE is a group work programme, which encourages offenders to reflect on what triggers their angry feelings and aggressive behaviours such that they can better learn to control them (SPS, 2015). The CARE programme is largely grounded in Cognitive Behavioural Therapy (CBT) principles, and such the focus is on encouraging offenders to reappraise their angry experiences so as to reduce the likelihood that they will be expressed aggressively. This CBT approach is paired with the practice of relaxation as an adaptive anger arousal control technique. The findings of this thesis suggest that focusing exclusively on anger regulation techniques may not be the most effective long-term solution for those who display attachment-related maladaptive regulation strategies. Instead, anger management programmes should aim to provide a secure base for offenders who display an insecure attachment disposition; especially ones

who reflect high levels of attachment anxiety. The nature of this approach may be equally effective in other non-clinical contexts where aggressive behaviour can be problematic, for example, the workplace (Hershcovis & Reich, 2013), contact sports (Mintah, Huddleston & Doody, 1999), or the classroom (Lawrence & Green, 2005), in which the employer, coach, or teacher could similarly serve as a secure and supportive figure. This process should involve the modelling of positive attachment behaviours, as the deficits seen in the emotion regulation processes of those high in attachment anxiety or attachment avoidance are most likely down to the probability that they were not given the opportunity to develop an adaptive repertoire of regulatory strategies within the inconsistent or neglectful confines of their original attachment relationship (e.g. with their primary caregiver in infancy; Calkins & Hill, 2007; Mikulincer, Shaver & Pereg, 2003). Targeting attachment security in this way, alongside the learning of adaptive regulatory strategies, would help increase both the access to a variety of techniques, and increase self-efficacy regarding their implementation (Mikulincer & Florian, 1998).

In terms of early intervention efforts where the development of aggressive behavioural tendencies is concerned, this thesis highlights the importance of facilitating the development of attachment security at an early stage, as attachment security may function as a protective factor against the development of such behaviours. Indeed, prior literature supports a link between attachment insecurity and juvenile delinquency (Lyons-Ruth, 1996; Van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999), as well as offending in adulthood (Fonagy et al.,

1996; Fonagy & Target, 1995). Education Scotland (2016) promotes attachment as one of their 'Nine Principles of Practice', and encourages those who care for and/or educate young children to strive to build secure and nurturing attachment relationships with the children in their care, and to encourage the development of such between the infants and primary caregivers with whom they work (Education Scotland, 2016). The present thesis supports the importance of policies such as these, as by course-correcting insecure attachment models early in development, it may be possible to minimise the risk of an insecure infant later displaying the elevated dispositional anger, hostile cognitions and aggressive behaviour associated with attachment anxiety and attachment avoidance in this thesis. Therefore, the findings of this project highlight the importance of secure attachment relationship modelling in early years' education, where teachers can provide a secure base for children who lack it in the home environment; and also in family support work, during which parents can be supported through the development of a more secure attachment relationship with their child.

6.2 Limitations and future directions

As with all studies of a correlational nature, this study cannot infer causation. The current study also relied on self-report measures, which can be problematic in the context of attachment avoidance and emotion suppression, as both factors have been linked to the under-reporting of symptoms (Schlatter & Cameron, 2010). Therefore, it is important to consider the self-report measure of anger regulation

strategies applied in Study 1b. Although self-report measures of emotion regulation are used in the majority of studies discussed throughout this thesis, there is increasing evidence to suggest that emotion regulation is often an implicit, unconscious process (Koole & Rothermund, 2011). This requires the acknowledgment that individuals may not always be aware of the strategies they implement to regulate their emotions, which will subsequently impact on their ability to self-report such processes. Further, using self-report measures to assess aggressive behaviour has also been criticised, as aggression is almost exclusively viewed as a negative behaviour (Vigil-Colet et al., 2012), potentially leading to a reluctance to admit behaving aggressively. However, Study 2 made attempts to control for these issues by using implicit measures of both anger suppression (a ratio of self-reported anger to physiological reactivity) and aggressive behaviour (the Taylor Aggression Paradigm, introduced to participants as a competitive reaction time task). While Study 2 offered further insight into attachment-related differences in anger regulation and aggressive behaviour, the sample size was relatively small ($n = 60$). Therefore, the lack of significant attachment-related differences in terms of physiological responding to the anger induction procedure, and the lack of association between attachment anxiety and self-reported anger change, may be a result of the lesser power associated with a smaller sample size (Button, Ioannidis, Mokrysz, Nosek, Flint, Robinson & Mufano, 2013). However, the p values and beta coefficients for these relationships were not approaching significance, which suggests that a larger sample size may not have had any major impact on the significance of the results.

Another possible limitation of Study 1a and Study 2 of this thesis is that they considered dispositional levels of self-esteem only, without consideration of self-esteem stability. As research suggests that this may be more relevant to angry and aggressive behaviour (Bushman et al., 2009; Papps & O'Carroll, 1998; Thomaes et al., 2008; Webster et al., 2007), future studies would benefit from considering whether high levels of self-esteem fluctuation can add to the predictive value of an attachment-based model of trait anger and aggression.

It is also important to consider the matter of a high percentage of students within the sample of Study 2 (89.6%). While Studies 1a and 1b were conducted online, and thus could be advertised and carried out both within and out with an institutional setting, Study 2 was conducted in a university-based laboratory, requiring on-campus participation. This may explain the selection effects outlined above, as students are more likely to volunteer for lab-based studies, especially those carried out on campus (Druckman & Kam, 2009). With this in mind, it is crucial to consider what impact the use of a negative essay feedback paradigm may have had on this sample. Firstly, as this could be seen to be a relatively familiar situation for students (i.e. receiving feedback on their writing), it may be that the negative feedback would be less likely to impact heavily on their anger levels as they may have been somewhat desensitised to negative feedback. However, Study 2 did demonstrate significant changes in self-reported anger levels and physiological responses to the provocation across the sample, which makes this explanation less

likely. Thus, it is perhaps more likely that students, regardless of their level of attachment insecurity, have an invested interest in doing well and achieving positive feedback on their performance, and therefore may respond to negative feedback with increased anger and heightened physiological arousal. This may have masked any attachment-related differences.

Another possible implication of using psychology students in particular may be that these individuals are likely to be familiar with the concept of deception in psychological research, and are taught to think critically when engaging with the procedural design of research (QAA, 2016). As future psychologists, these students are encouraged to question all aspects of the research they encounter throughout their degree, and so may be somewhat predisposed to some level of suspicion. This may have led to differences in responding to both questionnaires and behavioural aspects of the study as a result of conscious or unconscious bias stemming from their experience in psychology. For example, if a participant suspected that the experimenters were expecting a change in self-reported mood between the first and second self-report questionnaire, they may unconsciously report increases in this measure. However, only a small number of participants reported suspecting that no other participant was present in Study 2 ($n=3$), suggesting that while a selection of the sample may have been suspicious due to their experience in psychology ($n=23$), very few were correct in their suspicion. Further, when suspicious individuals were removed from the analysis, it did not impact on the results. This suggests that psychology students may be more prone to questioning the true nature of any study

they participate in, but the impact in the context of the current thesis was not substantial enough to influence the direction and/or significant of the findings (as demonstrated in Chapter 5.8 and Appendix 9).

As well as the potential paradigm-specific issues that may have arisen in using student participants in this thesis, there is also considerable debate around the use of student samples across all areas of research. First of all, some researchers suggest that the use of student-only samples restricts the generalisability of findings to a wider, more general, population (Kam et al., 2007). Despite this, some methodological experts believe that this proposition stems from a lack of understanding of the true requirements of external validity (Liyanaatchchi, 2007). It is suggested that for research to be considered externally valid, multiple replications are required across a variety of samples, in order to determine whether the results are consistent. As McGrath and colleagues state: "No one 'finding' is evidence, and no one study yields 'knowledge'; empirical information can gain credence only by accumulation of convergent results." (1982; p105). Further, Druckman and Kam (2009) suggest that empirical research should not be judged purely on its ability to generalise, but more so on its ability to contribute to the understanding and development of specific theoretical frameworks. This suggests that in the present thesis, the use of student participants should not necessarily be considered a hindrance of the generalisability of the findings, but instead may contribute to our understanding of the applicability of attachment theory as a framework for understanding the experience and expression of anger across diverse samples.

However, in light of the paradigm-specific issues highlighted above, it would still be beneficial for future research to replicate this study (using the same anger induction paradigm) with a more diverse sample to more clearly reflect attachment-related differences in this context.

Another potential limitation that should be taken into account when interpreting these findings relates to the potential ambiguity around what an increase in MAP and a decrease in FT actually reflects. While this and previous studies (e.g. Gross, 1998; Gross & Levenson, 1993, 1997; Richards & Gross, 1999) consider elevated MAP and decreased FT to indicate the experience of anger, sympathetic activation of the central nervous system has also been measured through these indicators in studies interested in anxiety and/or stress (Buss & Perry, 1992). Therefore, it is difficult to ascertain whether the physiological changes demonstrated in Study 2 were a reflection of increased anger, or of increased anxiety or stress following the feedback task. With this in mind, future research exploring attachment-related differences in responding to an anger-induction should include a wider variety of implicit response measures (e.g. observed facial expressions) to clarify how specifically anger is being targeted.

Finally, while the anger-induction procedure used in Study 2 took an interpersonal approach, with participants receiving feedback from a supposedly unknown peer, it is possible that attachment-related differences in anger responding are only relevant in the context of attachment relationships. Indeed, a

number of studies looking at attachment-related processes focus on their occurrence in attachment-relevant situations (e.g. when attachment threat is primed; Mikulincer, Gillath & Shaver, 2002, or where partner is present; Simpson, Rholes, Orina & Grich, 2002). Therefore, future research would benefit from applying this methodological procedure with romantic couples, where the individual's partner is the one seen to be providing the negative feedback, and participants believe they are competing against their partner in the reaction time task. This would help to clarify whether attachment-related differences in aggression following an anger-induction procedure are perhaps only present in attachment-relevant situations. Further, as this thesis has highlighted the importance of attachment in the maladaptive regulation of anger and aggressive behaviour, future research would also benefit from employing an implicit security priming procedure (e.g. Carnelley & Rowe, 2007; Gillath, Selcuk & Shaver, 2008) to determine whether priming for attachment security would improve an individual's ability to adaptively regulate anger, and subsequently reduce aggressive behaviour. This would provide further insight into whether intimate partner violence (IPV) interventions should target the development of positive attachment models, rather than purely focusing on anger control techniques.

6.3 Conclusion

While prior research has demonstrated an association between poor anger regulation and aggression (Blackburn, 1971; Davey et al., 2005; Megargee, 1970;

Norstrom & Pape, 2010; Verona & Carbonell, 2000), attachment theory provides a useful framework for identifying the mechanisms that underlie the maladaptive regulation of anger and subsequent aggressive behaviour. Attachment insecurity has been associated with difficulties in regulating both negative and positive emotions, as adaptive regulatory processes are not developed through positive infant-caregiver experiences, resulting in the reliance on maladaptive strategies such as suppression to reduce unwanted emotional experiences (Braungart & Stifter, 1991; Fonagy et al., 2004; Nachmias et al., 1996). This thesis was designed to investigate attachment-related differences in dispositional anger, anger regulation and aggressive behaviour.

Study 1a firstly investigated the relationship between attachment and dispositional anger through the use of self-report measures, and demonstrated that attachment anxiety was a unique independent predictor of dispositional anger. Following on from the analysis in Study 1a, Study 1b found that attachment anxiety was indirectly related to physical aggression through the under-regulation of anger, and low anger control. Further, the relationships between both attachment dimensions and hostility were also mediated by differential maladaptive anger regulation processes. As Study 1b provided evidence to support attachment-related differences in aggression, mediated by specific maladaptive anger regulation processes, Study 2 aimed to explore these relationships further through a lab-based anger-induction procedure. Study 2 demonstrated that attachment avoidance was a significant predictor of anger suppression, whilst attachment anxiety was a significant predictor of actual aggressive behaviour following anger-induction.

Considered concurrently, the findings from this thesis highlight the importance of understanding maladaptive anger regulation processes as underlying mechanisms that facilitate the association between attachment and both hostile cognitions and aggressive behaviour in adulthood. While the majority of anger management interventions focus on developing skills in anger control, this thesis suggests that primary efforts may be better placed in the promotion of secure working models of attachment in the perpetrator; from which improved anger regulation skills will follow.

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Appendices

Appendix 1: Ethical approval confirmations

Appendix 1a - Ethical Approval Confirmation (Study 1a and 1b)

FOR COMPLETION BY THE HEAD OF DIVISION/HEAD OF RESEARCH CENTRE

Either

I refer this application back to the applicant for the following reason(s):

Name *(if you have an electronic signature please include it here)*

_____ Head of Division / Research
Centre

Date _____

Please return the form to the applicant.

Or

Please tick **one** of the alternatives below and delete the others.

I refer this application to the QMU Research Ethics Panel.

I find this application acceptable and an application for Ethical Approval should now be submitted to a relevant external committee.

I grant Ethical Approval for this research.

Name *(if you have an electronic signature please include it here)*

_____ Head of Division / Research Centre

Date __04/03/14_____

Please send one copy of this form to the applicant and one copy to the Secretary to the Research Ethics Panel, Governance and Quality Enhancement, Registry.

Date application returned: _____

FOR COMPLETION BY THE HEAD OF DIVISION/HEAD OF RESEARCH CENTRE

Either

I refer this application back to the applicant for the following reason(s):

Name *(if you have an electronic signature please include it here)*

Centre Head of Division / Research

Date _____

Please return the form to the applicant.

Or

Please tick **one** of the alternatives below and delete the others.

I refer this application to the QMU Research Ethics Panel.

I find this application acceptable and an application for Ethical Approval should now be submitted to a relevant external committee.

I grant Ethical Approval for this research.✓

Name *(if you have an electronic signature please include it here)*



Centre Head of Division / Research

Date ____18-06-14____

Please send one copy of this form to the applicant and one copy to the Secretary to the Research Ethics Panel, Governance and Quality Enhancement, Registry.

Date application returned: ____18-06-14____

FOR COMPLETION BY THE HEAD OF DIVISION/HEAD OF RESEARCH CENTRE

Either

I refer this application back to the applicant for the following reason(s):

Name *(if you have an electronic signature please include it here)*

_____ Head of Division / Research
Centre

Date _____

Please return the form to the applicant.

Or

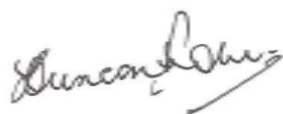
Please tick **one** of the alternatives below and delete the others.

I refer this application to the QMU Research Ethics Panel.

I find this application acceptable and an application for Ethical Approval should now be submitted to a relevant external committee.

I grant Ethical Approval for this research.✓

Name *(if you have an electronic signature please include it here)*



_____ Head of Division / Research Centre

Date __11/11/14_____

Please send one copy of this form to the applicant and one copy to the Secretary to the Research Ethics Panel, Governance and Quality Enhancement, Registry.

Date application returned: _____

Appendix 2: Information sheets

Appendix 2a – Information Sheet (Study 1a and 1b)



Queen Margaret University
EDINBURGH

My name is Zara Lochrie and I am a PhD candidate from the School of Psychology & Sociology at Queen Margaret University in Edinburgh. I am undertaking research on personality and relationships as part of my degree course and am looking for volunteers over the age of 18 to take part in this study.

What you will be asked to do

If you participate, you will be required to fill out a set of 4 short questionnaires, which should take 15-20 minutes. The researcher is not aware of any risks involved in taking part in this project. You will be provided with a debriefing sheet once you have completed the questionnaires, which will provide you with contact information for the researcher, should you wish to ask any questions following your participation.

Confidentiality

Participation is entirely voluntary. Your participation will remain completely anonymous and there will be no way for anyone to link you to your questionnaire responses. You will not be asked to provide your name and response sets will be coded with a participant number to protect your identity. Once you have completed the questionnaires, only the researcher and their supervisory team will have access to your results.

How the results will be used

The data from this research will be used for the researchers PhD thesis and may be published in an academic journal or presented at a conference.

Right to withdraw

You will be free to omit any questions that you are not comfortable answering and, if at any time you feel that you would rather not continue, you are free to withdraw without explanation by closing your browser. However the anonymous nature of the study means that your data cannot be withdrawn after you have completed the questionnaires so please be sure to withdraw before the end of the survey, should you decide that you no longer want to take part.

If you would like to ask any questions before taking part please e-mail the researcher. You may also contact the research supervisor or an independent person,

who knows about this project but is not involved in it. All contact details are provided below.

If you have read and understood this information sheet and would like take part in the study please click next to view the consent form.

Researcher: Zara Lochrie zlochie@gmu.ac.uk

Supervisor: Dr Karen Goodall kgoodall@gmu.ac.uk

Independent Adviser: Dr Duncan Robb drobb@gmu.ac.uk

Address for all contacts: Division of Psychology and Sociology, Queen Margaret University, Edinburgh, EH21 6UU

Appendix 2b – Information Sheet (Study 2; Pilot)



Queen Margaret University
EDINBURGH

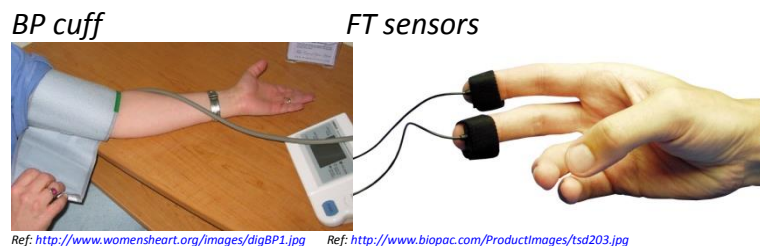
'Investigating the relationship between intelligence, personality and physiological well-being'

My name is Zara Lochrie and I am a PhD candidate from the Division of Psychology & Sociology at Queen Margaret University in Edinburgh. I am undertaking research on the relationship between intelligence, personality and physiological well-being as part of my degree course and am looking for volunteers over the age of 18 who are not currently taking medication with effects on the cardiovascular, respiratory, or central nervous system to take part in this study.

What you will be asked to do

If you decide to take part, you will be asked not to consume alcohol, caffeine or nicotine in the two hours prior to participation.

As we are interested in your physiological well-being, we will be measuring your blood pressure (BP) and finger temperature (FT) at various stages throughout the session. Blood pressure will be measured using a standard blood pressure cuff and finger temperature will be measured using finger sensors on your non-dominant hand. Examples of these can be seen below:



Ref: <http://www.womensheart.org/images/diqBP1.jpg>

Ref: <http://www.biopac.com/ProductImages/tsd203.jpg>

At the beginning of the study, you will be asked to fill out one mood questionnaire and two personality questionnaires. You will then be asked to sit still and relax for two minutes while we take your baseline BP and FT measurements.

For the rest of the session, you will be working with another participant who will be performing the same experiment in another room, with another experimenter. You will perform a short writing task with the other participant, in which you will be asked to write about your views on a current issue.

Finally, you will be asked to watch a short film clip before your final physiological measurements are taken.

You will then be fully debriefed by the researcher and will be provided with a debriefing sheet so you can read more about the expected findings of the study. You will also be invited to ask questions and you will be given contact information for the researcher, should you have questions at a later date.

Confidentiality

Participation is entirely voluntary. You will not be asked to provide your name and any data we collect from you will be coded with a participant number to protect your identity. Once you have completed the experiment, only the research team will have access to your anonymised results.

How the results will be used

The data from this research will be used for the researchers PhD thesis and may be published in an academic journal or presented at a conference.

Right to withdraw

You are free to withdraw from this study at any time without explanation. If you decide you would no longer like to take part, please let the researcher know so that you can be debriefed and any responses you have given can be destroyed. Your final opportunity to withdraw your data from the study will be after debriefing takes place, after which it will be anonymised.

Feel free to ask the researcher any questions before agreeing to take part. You may also contact the research supervisor or an independent person, who knows about this project but is not involved in it. All contact details are provided below.

If you have read and understood this information sheet and would like take part in the study please now read the consent form.

Researcher: Zara Lochrie zlochrie@gmu.ac.uk

Supervisor: Dr Karen Goodall kgoodall@gmu.ac.uk

Independent Adviser: Dr Duncan Robb drobb@gmu.ac.uk

Address for all contacts: Division of Psychology and Sociology, Queen Margaret University, Edinburgh, EH21 6UU

Appendix 2c – Information Sheet (Study 2)



Queen Margaret University
EDINBURGH

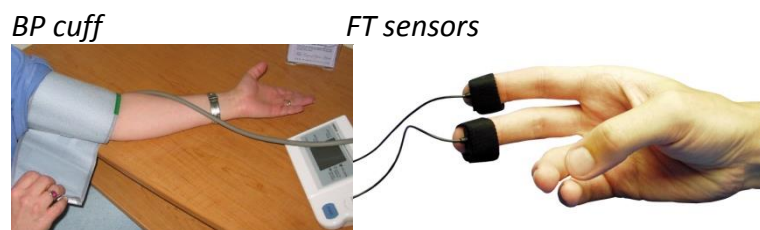
‘Investigating the relationship between intelligence, personality and physiological well-being’

My name is Zara Lochrie and I am a PhD candidate from the Division of Psychology & Sociology at Queen Margaret University in Edinburgh. I am undertaking research on the relationship between intelligence, personality and physiological well-being as part of my degree course and am looking for volunteers over the age of 18 who are not currently taking medication with effects on the cardiovascular, respiratory, or central nervous system to take part in this study.

What you will be asked to do

If you decide to take part, you will be asked not to consume alcohol, caffeine or nicotine in the two hours prior to participation.

As we are interested in your physiological well-being, we will be measuring your blood pressure (BP) and finger temperature (FT) at various stages throughout the session. Blood pressure will be measured using a standard blood pressure cuff and finger temperature will be measured using finger sensors on your non-dominant hand. Examples of these can be seen below:



Ref: <http://www.womensheart.org/images/diqBP1.jpg>

Ref: <http://www.biopac.com/ProductImages/tsd203.jpg>

At the beginning of the study, you will be asked to fill out one mood questionnaire and two personality questionnaires. You will then be asked to sit still and relax for two minutes while we take your baseline BP and FT measurements.

For the rest of the session, you will be working with another participant who will be performing the same experiment in another room, with another experimenter. Firstly you will perform a short writing task with the other participant, in which one of you will be asked to write about your views on a current issue. This will be

followed by a computerised reaction-time task, in which you will compete against the other participant (again, they will be taking part in another room). This task will require you to identify when a square on the computer screen changes colour.

Finally, you will be asked to watch a short film clip before your final physiological measurements are taken.

You will then be fully debriefed by the researcher and will be provided with a debriefing sheet so you can read more about the expected findings of the study. You will also be invited to ask questions and you will be given contact information for the researcher, should you have questions at a later date.

Confidentiality

Participation is entirely voluntary. You will not be asked to provide your name and any data we collect from you will be coded with a participant number to protect your identity. Once you have completed the experiment, only the research team will have access to your anonymised results.

How the results will be used

The data from this research will be used for the researchers PhD thesis and may be published in an academic journal or presented at a conference.

Right to withdraw

You are free to withdraw from this study at any time without explanation. If you decide you would no longer like to take part, please let the researcher know so that you can be debriefed and any responses you have given can be destroyed. Your final opportunity to withdraw your data from the study will be after debriefing takes place, after which it will be anonymised.

Feel free to ask the researcher any questions before agreeing to take part. You may also contact the research supervisor or an independent person, who knows about this project but is not involved in it. All contact details are provided below.

If you have read and understood this information sheet and would like take part in the study please now read the consent form.

Researcher: Zara Lochrie zlochie@gmu.ac.uk

Supervisor: Dr Karen Goodall kgoodall@gmu.ac.uk

Independent Adviser: Dr Duncan Robb drobb@gmu.ac.uk

Address for all contacts: Division of Psychology and Sociology, Queen Margaret University, Edinburgh, EH21 6UU

Appendix 3: Consent Form (Used in all Studies)



Queen Margaret University
EDINBURGH

I understand that I am under no obligation to take part in this study.

I understand that I have the right to withdraw from this study at any stage without giving any reason.

I understand that my anonymised responses will be used in the write-up of the researchers PhD thesis, and may be published in a journal or presented at a conference.

I have read and understood the information provided by the researcher and I have had adequate opportunity to ask questions. All questions have been answered to my satisfaction.

I agree to take part in this study.

Participant Name.....

Participant Signature.....

Researcher Signature.....

Date.....

Contact details of the researcher:

Researcher

Zara Lochrie zlochrie@gmu.ac.uk

Address

PhD Student, Psychology
Queen Margaret University, Edinburgh
Queen Margaret University Drive
Musselburgh, East Lothian, EH21 6UU

Appendix 4: Debrief sheets

Appendix 4a – Study 1a and 1b Debrief Sheet



Queen Margaret University
EDINBURGH

The main aim of this study was to investigate the relationship between adult attachment and the experience, expression and control of anger.

Adult attachment is measured along two dimensions: anxiety (how anxious we are about rejection) and avoidance (the extent to which we limit or avoid close relationships). Research suggests that attachment anxiety and avoidance can have different effects on how we regulate our emotions. Those who are high in avoidance tend to suppress the expression of negative emotions and distance themselves from others, while those high in anxiety often appear very distressed when a negative emotion arises and tend to seek close contact with others.

However, very little research has considered how attachment is related to anger regulation, with the majority of studies focusing on sadness and fear. Anger differs from other supposedly 'negative' emotions as it can be associated with power, which may alter how those high in avoidance respond to it. Expressing anger may actually help them achieve their goal of maintaining distance from others.

Due to the close relationship between anger and aggression, we were also interested in whether anxiety and avoidance were related to aggression, and whether this relationship was influenced by specific anger regulation techniques. Some researchers claim that aggression is a behavioural outcome of anger, so this would provide us with a deeper insight into the expression of anger and its relationship with attachment.

Finally, as research indicates that self-esteem is related to both aggression and attachment, a self-esteem measure was also included to control for these relationships.

As mentioned at the beginning of the study, please feel free to contact the researcher should you have any further questions about this research.

Thanks for taking part and have a nice day!

Contact details:

Researcher: Zara Lochrie zlochrie@gmu.ac.uk

Supervisor: Dr Karen Goodall kgoodall@gmu.ac.uk

Independent Adviser: Dr Duncan Robb drobb@gmu.ac.uk

Address for all contacts: Division of Psychology and Sociology, Queen Margaret University, Edinburgh, EH21 6UU

Please follow the link below for information and support on dealing with anger:
<http://www.mind.org.uk/information-support/types-of-mental-health-problems/anger/>



Queen Margaret University
EDINBURGH

The main aim of this pilot study was to determine the effectiveness of a laboratory-based anger induction, which may be used in a larger-scale study on attachment, anger and aggression. As research suggests that anger requires a high level of personal engagement (Gross & Levenson, 1995), an 'interpersonal insult' approach was taken in this experiment.

The Writing Task

There was, in fact, no other participant taking part. The feedback you were given on your writing was actually pre-written by the experimenter, and the same negative feedback was given to all participants. The aim of this negative feedback was to induce mild feelings of anger. Changes in your self-reported anger (anger expression) and your physiological responses (anger reactivity) following this induction will allow us to identify whether the negative feedback has been successful.

Research suggests that a rise in blood pressure, and a reduction in finger temperature, is indicative of emotional reactivity as they both reflect sympathetic activation of the cardiovascular system (Gross, 1998; Gross & Levenson, 1993, 1997; Richards & Gross, 1999). This study aims to identify how blood pressure and finger temperature react to this specific anger induction to confirm whether they are both suitable indicators of anger reactivity.

We are also interested in the impact of the feedback-based anger induction on self-reported anger. This is what the 'mood questionnaires' were measuring. Previous research suggests that this type of anger induction increases levels of self-reported anger and aggression (Denson et al., 2010; Harmon-Jones & Sigelman, 2001; Memedovic et al., 2010) and this study aims to clarify this relationship.

The Comedy Clip

The stand-up comedy clip you watched at the end of the experiment was included to help you recover from any negative emotions you may have felt following the anger induction.

As mentioned at the beginning of the study, please feel free to contact the researcher should you have any further questions about this research. If you would like to withdraw your data from this study having read this information, please let the researcher know before leaving the room.

Thanks for taking part and have a nice day!

Contact details:

Researcher: Zara Lochrie zlochrie@qmu.ac.uk

Supervisor: Dr Karen Goodall kgoodall@qmu.ac.uk

Independent Adviser: Dr Duncan Robb drobb@qmu.ac.uk

Address for all contacts: Division of Psychology and Sociology, Queen Margaret University, Edinburgh, EH21 6UU

For information and support on dealing with anger please visit the following website:

<http://www.mind.org.uk/information-support/types-of-mental-health-problems/anger/>

You can also find information on the counselling services available at QMU by following the link below:

http://www.qmu.ac.uk/prospective_students/student_services/counselling.htm



Queen Margaret University
EDINBURGH

The aim of this research is to look at how adult attachment is related to the regulation of anger by investigating the experiential, behavioural and physiological responses to an anger provocation.

The Personality Questionnaires

The questionnaires you completed at the beginning of the study were measures of adult attachment and self-esteem as we are interested in whether anger expression, anger reactivity and self-esteem are correlated with adult attachment dimensions of avoidance and anxiety.

The Writing Task

There was, in fact, no other participant taking part. The feedback you were given on your writing was actually pre-written by the experimenter, and the same negative feedback was given to all participants. The aim of this negative feedback was to induce mild feelings of anger.

We are interested in how you react physiologically to this task. Research suggests that a rise in blood pressure, and a reduction in finger temperature, is indicative of emotional reactivity as they both reflect sympathetic activation of the cardiovascular system (Gross, 1998; Gross & Levenson, 1993, 1997; Richards & Gross, 1999). We are also interested in the impact of the feedback-based anger induction on self-reported anger. This is what the 'mood questionnaires' were measuring. Previous research suggests that this type of anger induction increases levels of self-reported anger and aggression (Denson et al., 2010; Harmon-Jones & Sigelman, 2001; Memedovic et al., 2010) and this study aims to clarify this relationship.

The Reaction-Time Task

The reaction-time task was included as a measure of aggression. This task was rigged to ensure that you won and lost an equal number of trials, and levels of aggressive feelings towards the fictional 'other participant' were measured by the loudness and duration of the white noise you assigned to them. This will allow us to identify whether reactions to the anger induction are related to levels of aggression.

The Comedy Clip

The stand-up comedy clip you watched at the end of the experiment was included

to help you recover from any negative emotions you may have felt following the anger induction.

As mentioned at the beginning of the study, please feel free to contact the researcher should you have any further questions about this research. If you would like to withdraw your data from this study having read this information, please let the researcher know before leaving the room.

Thanks for taking part and have a nice day!

Contact details:

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Supervisor: Dr Karen Goodall kgoodall@gmu.ac.uk

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For information and support on dealing with anger please visit the following website:

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Appendix 5 – STAXI-2 Copyright Screenshot

Personality & Relationships - Internet Explorer

https://www.survey.bris.ac.uk/manifestid=181869&op=preview

Module Content - Research... QMU Staff Intranet - Home Personality & Relations...

File Edit View Favorites Tools Help

Page Safety Tools

j. I lose my temper.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. I try to simmer down.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. I withdraw from people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. I keep my cool.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n. I make sarcastic remarks to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o. I try to soothe my angry feelings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p. I boil inside, but I don't show it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
q. I control my behaviour.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
r. I do things like slam doors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
s. I endeavour to become calm again.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
t. I tend to harbour grudges that I don't tell anyone about.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
u. I can stop myself from losing my temper.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
v. I argue with others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
w. I reduce my anger as soon as possible.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
x. I am secretly quite critical of others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
y. I try to be tolerant and understanding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
z. I strike out at whatever infuriates me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
aa. I do something relaxing to calm down.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ab. I am angrier than I am willing to admit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ac. I control my angry feelings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ad. I say nasty things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ae. I try to relax.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
af. I'm irritated a great deal more than people are aware of.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Well done - You're well over half way, not long to go now!

Continue >

Survey testing only

Check Answers & Continue >

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Appendix 6: Participant instructions for essay writing task used in anger induction procedure

You now have 10 minutes to argue your opinion on one of the following topics. Please choose the topic you feel most passionately about.

The researcher will let you know when you have one minute left.

- 1. Should assisted suicide be legal?**
- 2. Should Scotland have gone independent?**
- 3. Can people be *born* evil?**

Please indicate which topic you have chosen by stating the topic number at the top of your writing page.

Appendix 7: Negative feedback sheet used in anger induction procedure (based on a template provided to the student by Professor Eddie Harmon-Jones, University of New South Wales, Australia)

Feedback Ratings

Once you have read and carefully considered the essay you were given, please complete the following items. The ratings will assess what you think about the writer and their writing. Using the 9-point scales, rate the person on the following characteristics.

Unintelligent	1	2	3	4	5	6	7	8	9	Intelligent
Boring	1	2	3	4	5	6	7	8	9	Thought-Provoking
Unfriendly	1	2	3	4	5	6	7	8	9	Friendly
Illogical	1	2	3	4	5	6	7	8	9	Logical
Disreputable	1	2	3	4	5	6	7	8	9	Respectable
Irrational	1	2	3	4	5	6	7	8	9	Rational

Additional Comments?	I can't believe an educated person would think like this. I hope this person learns something at QMU!
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Appendix 8: Screenshot of the TAP reaction time task

Competitive Reaction Time Task


File version 1.4.2 - 06/10/2012

Instructions and Practice
Set the 'noise' and 'duration' (on the right). Press 'Ready' to hear how loud and how long the noise is.

Opponent's Feedback to You

noise=	duration=
10	5.0
9	4.5
8	4.0
7	3.5
6	3.0
5	2.5
4	2.0
3	1.5
2	1.0
1	0.5
0	0.0

Set noise levels



Your Feedback to Opponent

noise=	duration=
10	5.0
9	4.5
8	4.0
7	3.5
6	3.0
5	2.5
4	2.0
3	1.5
2	1.0
1	0.5
0	0.0

Continue

Appendix 9: Results from additional regression analysis where suspicious participants are excluded (Study 2)

Appendix 9a - Regressions with all suspicious participants excluded

Attachment anxiety and attachment avoidance as predictors of anger suppression

As shown in Table 13, a regression model was developed to determine whether attachment anxiety and/or avoidance were significant predictors of anger suppression, controlling for age, baseline FT and baseline self-report anger, when all suspicious participants were excluded. At step 1, age, baseline FT and baseline self-report anger were controlled for. At this stage, neither age nor baseline self-report anger were significant predictors of aggression, but baseline FT was significant ($\beta = -.37, p = .009$). At stage 2, the addition of attachment avoidance and attachment anxiety to the regression equation resulted in a significant increase to R^2 ($R^2 = .31, R^2_{\text{change}} = .11, p = .003$; medium to large effect). In the final model, attachment avoidance ($\beta = -.31, p = .018$; medium to large effect) and baseline FT ($\beta = -.41, p = .002$) were the only significant predictors of anger suppression, with baseline FT presenting as a marginally stronger predictor. This lends support for hypothesis 3.5 as attachment avoidance was a significant predictor of anger suppression in the context of a laboratory-cased anger induction paradigm. This pattern of results is consistent with that identified in the main body of the thesis, where all participants were included in the analysis (see page 223).

Table 133. Hierarchical multiple regression analysis predicting anger suppression scores with attachment avoidance and attachment anxiety, controlling for age, baseline FT and baseline SR Anger (All suspicious participants excluded; n= 55)

	R^2	ΔR^2	F_{change}	R^2_{change}	B	95% CI	
						LL	UL
<i>Step 1</i>	.09	.06	2.48	.09			
Age					-.11	-.23	.10
Baseline FT					-.37	-.81	-.12
Baseline SR Anger					.09	.49	1.03
<i>Step 2</i>	.20	.15**	9.21	.10			
Age					-.13	-.24	.08
Baseline FT					-.41**	-.86	-.20
Baseline SR Anger					.01	-.74	.81
Attachment Avoidance					-.31**	-3.43	-.33
Attachment Anxiety					.27	-.03	3.45

* $p < .05$; ** $p < .01$

Attachment anxiety and attachment avoidance as predictors of aggression

A further regression model was developed to determine whether attachment anxiety and/or avoidance were significant predictors of aggression, controlling for age, when only participants who were suspicious that there was no other participant were excluded (see Table 14). At Step 1 of this model, age was not a significant predictor of aggression. The addition of attachment anxiety and attachment avoidance to the regression equation resulted in a significant increase to R^2 ($R^2 = .23$, $R^2_{change} = .19$, $p = .004$; medium to large effect). Within the final model,

attachment anxiety was a significant independent predictor of aggression ($\beta=.46$, $p=.001$), demonstrating a large effect. Neither attachment avoidance nor age were significant predictors in the final model. This lends support for hypothesis 3.6, as attachment anxiety independently predicted a significant amount of variance in aggression scores. This pattern of results is consistent with that identified in the main body of the thesis, where all participants were included in the analysis (see page 225).

Table 14. Hierarchical multiple regression analysis predicting aggression scores with attachment anxiety and attachment avoidance, controlling for age (All suspicious participants excluded; n= 55)

	R^2	ΔR^2	F_{change}	R^2_{change}	B	95% CI	
						LL	UL
<i>Step 1</i>	.04	.02	2.02	.04			
Age					-.19	-.10	.02
<i>Step 2</i>	.23	.18**	6.19	.19			
Age					-.14	-.08	.03
Attachment Anxiety					.46**	.41	1.53
Attachment Avoidance					-.08	-.68	.38

* $p<.05$; ** $p<.01$

Appendix 9b - Regressions with those suspicious of no other participant excluded only

Attachment anxiety and attachment avoidance as predictors of anger suppression

As shown in Table 15, a regression model was developed to determine whether attachment anxiety and/or avoidance were significant predictors of anger suppression, controlling for age, baseline FT and baseline self-report anger, when all participants who were suspicious that there was no other participant were excluded. At step 1, age, baseline FT and baseline self-report anger were controlled for. At this stage, neither age nor baseline self-report anger were significant predictors of aggression, but baseline FT was ($\beta = -.39, p = .001$). At stage 2, the addition of attachment avoidance and attachment anxiety to the regression equation resulted in a significant increase to R^2 ($R^2 = .24, R^2_{\text{change}} = .11, p < .001$; medium effect). In the final model, attachment avoidance ($\beta = -.33, p = .003$; large effect) and baseline FT ($\beta = -.39, p < .001$) were the only significant predictors of anger suppression. This lends support for hypothesis 3.5 as attachment avoidance was a significant independent predictor of anger suppression in the context of a laboratory-cased anger induction paradigm. This pattern of results is consistent with that identified in the main body of the thesis, where all participants were included in the analysis (see page 223).

Table 145. Hierarchical multiple regression analysis predicting anger suppression scores with attachment avoidance and attachment anxiety, controlling for age, baseline FT and baseline SR Anger (Those suspicious of no other participant

excluded; n= 74)

	R^2	ΔR^2	F_{change}	R^2_{change}	B	95% CI	
						LL	UL
<i>Step 1</i>	.08	.05	2.14	.08			
Age					-.08	-.19	.09
Baseline FT					-.39**	-.78	-.21
Baseline SR Anger					.07	-.34	.69
<i>Step 2</i>	.20	.14**	4.70	.11			
Age					-.12	-.21	.06
Baseline FT					-.39**	-.77	-.23
Baseline SR Anger					.07	-.35	.66
Attachment Avoidance					-.33**	-3.05	-.64
Attachment Anxiety					.18	-.26	2.51

* $p < .05$; ** $p < .01$

Attachment anxiety and attachment avoidance as predictors of aggression

A further regression model was developed to determine whether attachment anxiety and/or avoidance were significant predictors of aggression, controlling for age, when only participants who were suspicious that there was no other participant were excluded (see Table 16). At Step 1 of this model, age was not a significant predictor of aggression scores. The addition of attachment anxiety and attachment avoidance to the regression equation resulted in a significant increase to R^2 ($R^2 = .14$, $R^2_{change} = .12$, $p = .013$; medium effect). Within the final model, attachment anxiety was the only significant independent predictor of aggression ($\beta = .37$, $p = .003$), demonstrating a large effect. This lends support for hypothesis 3.6, as attachment

anxiety predicted a significant amount of variance in aggression scores. This pattern of results is consistent with that identified in the main body of the thesis, where all participants were included in the analysis (see page 225).

Table 156. Hierarchical multiple regression analysis predicting aggression scores with attachment anxiety and attachment avoidance, controlling for age (Those suspicious of no other participant excluded; n= 74)

	R^2	ΔR^2	F_{change}	R^2_{change}	β	95% CI	
						LL	UL
<i>Step 1</i>	.02	.01	1.80	.02			
Age					-.16	-.08	.02
<i>Step 2</i>	.14	.11**	4.78	.12			
Age					-.11	-.07	.03
Attachment Anxiety					.37**	.27	1.27
Attachment Avoidance					-.11	-.66	.24

* $p < .05$; ** $p < .01$